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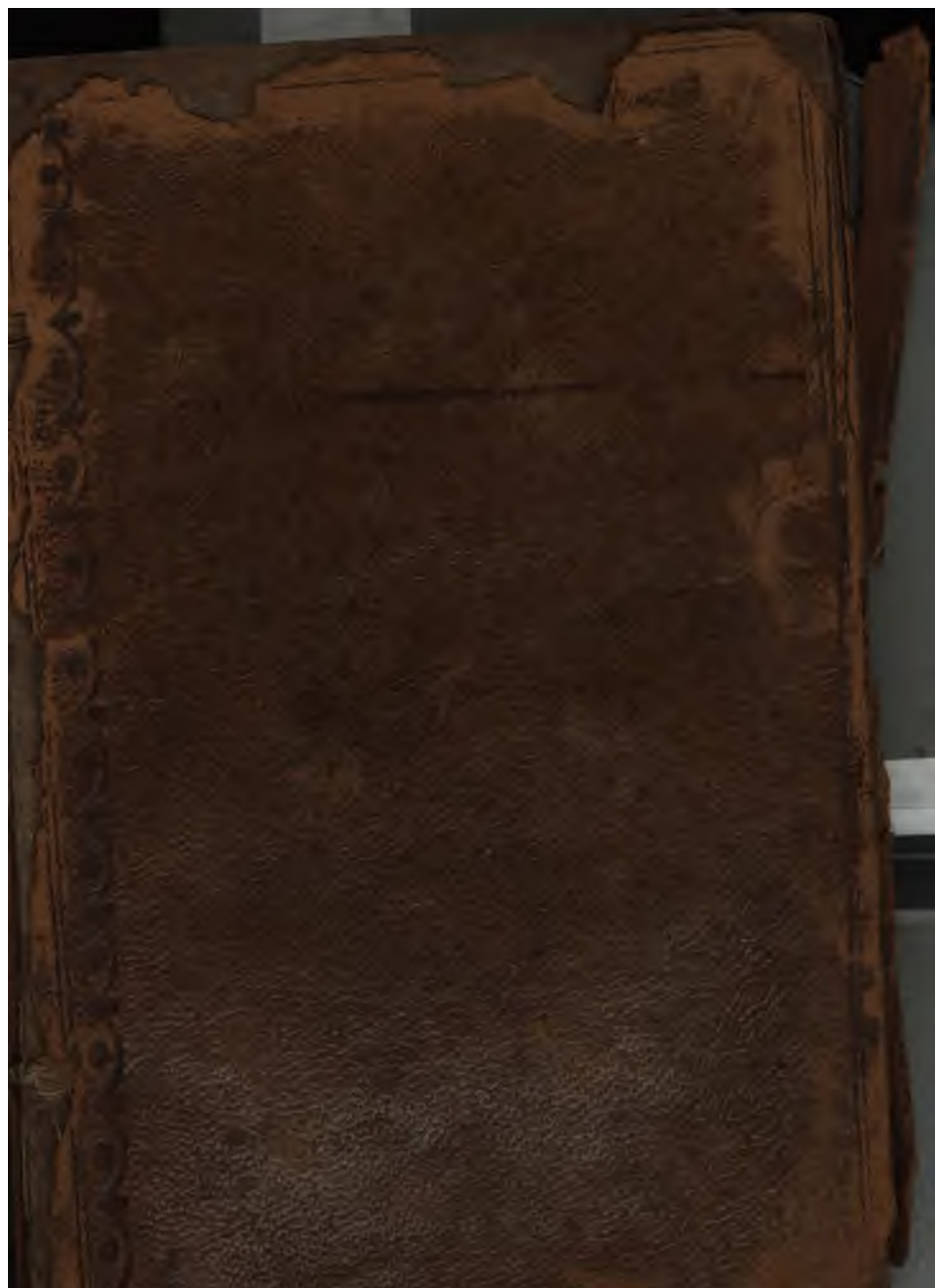
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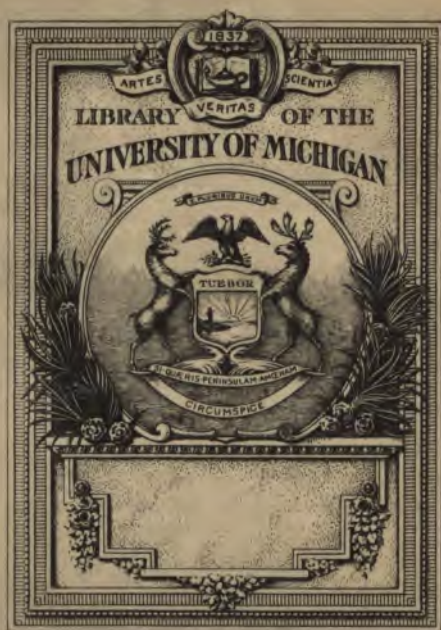
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*Grand cuts*

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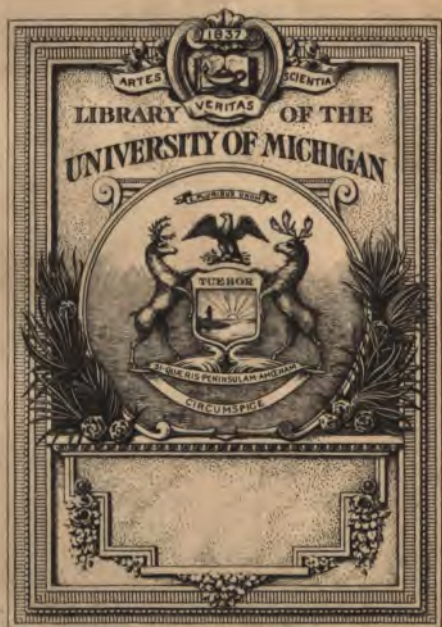


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*Grand cuts*

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A  
TREATISE  
OF  
ECLIPSES  
OF THE  
SUN and MOON,

For Thirty-five YEARS, commencing

*Anno* 1715, ending 1749.

CONTAINING

The Beginning, Middle and Ending, the Digits Eclipsed; together, with the Types of those that will be visible at *London*, with the General Times of the Solar Eclipses, and the Limits of the Shade of the Moon determined.

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*Astra regunt Homines, sed regit Astra Deus.*

By CHARLES LEADBETTER,  
Teacher of the MATHEMATICKS.

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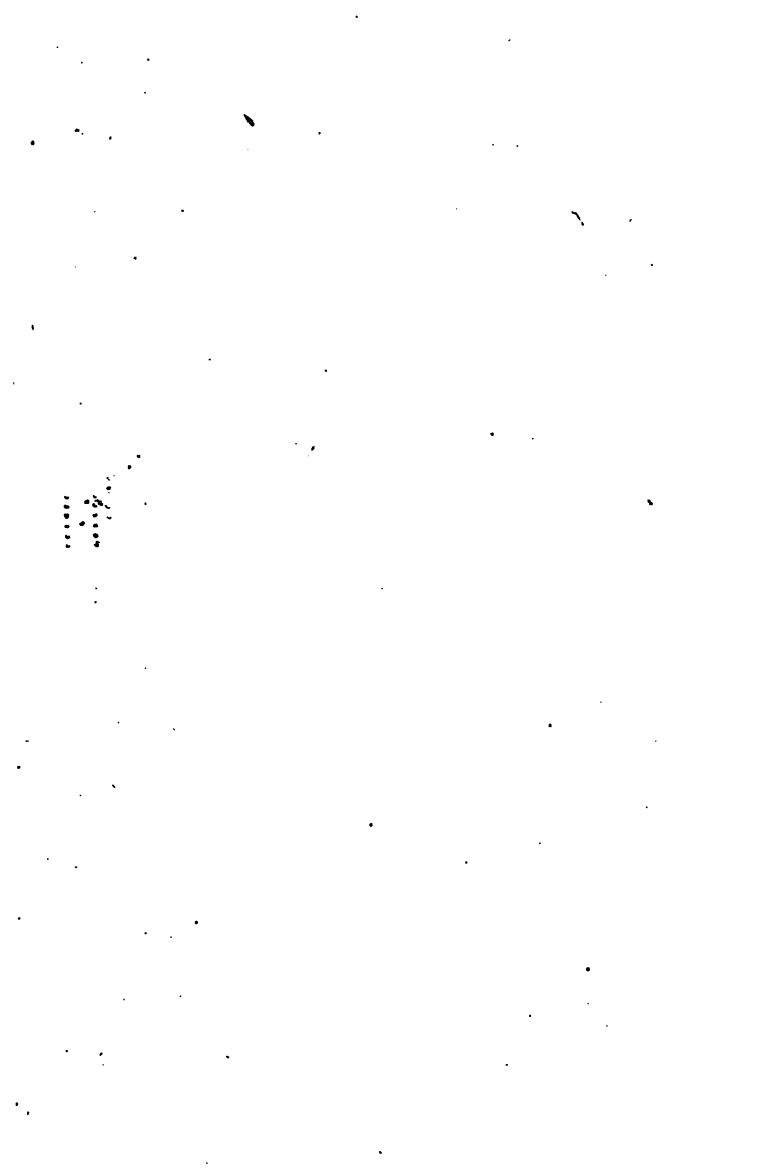
THE SECOND EDITION, with ADDITIONS.

O come hither and behold the Works of the Lord, &c. Pf. 46. 8.  
I thank thee, O Father, Lord of Heaven and Earth, that thou  
hast hid these things from the Wise and Prudent, and hast  
revealed them unto Babes; even so Father, for so it seemed  
good in thy sight. St. Mat. 11, 25, 26. St. Luke 10. 21.

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L O N D O N:

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TO THE  
Sons of URANIA.

**A**S there is no part of the Mathematicks so noble and excellent as Astronomy; so there is no part of Astronomy so difficult as the Doctrine of Eclipses, especially when the Calculation of Solar Eclipses is limited and determin'd to a certain Longitude and Latitude, in regard of the tedious computation of the Moon's Parallax in Longitude and Latitude; upon which the Solar Eclipses principally depends.

This piece of Learning is the very superstructure and punctilio of Astronomy. And so rare it is to be found amongst Men, that not One of Twenty thousand hath attain'd to it; it is the very Crown and highest pitch (and may justly Challenge to it self the Sovereignty and Precedency) of all humane Learning whatsoever. 'Tis not only Speculative (for the Ignorant) and Contemplative (for the Ingenious) but also Pre-dicline, (because it tells us as well what Eclipses is past, as what is to come.) Is there any Art or Science under Heaven (except Astronomy) that can tell me whether there will be any Eclipse of the Luminaries in August, in the Year 1816. or (I might have said) 7816. (supposing the World to continue so long)? Can either Philosophy, Physick, or Logick do it? No, it's impossible; and yet an Astronomer can resolve the Question in half an hour. But to return.

1. Eclipses of the Luminaries are twofold, viz. Solar and Lunar. The Solar is caus'd by the interposition of the Moon, between the Sun and Earth; whereby some particular Tract of the Earth is deprived of the Sun's Light.

*Light during the Eclipse: at which time other Places of the World, have the full Light of the Sun.*

2. *The Lunar Eclipses are Universal, and appear in all Places of the same quantity and duration: 1 the Moon being an Opaque Body, and having no Light but what she receives from the Sun, can never be eclipsed or lose the Sun's Light; but at the Full Moon when she hath little or no Latitude, and Diametrically opposite to the Sun, and the Earth interposing between them (recta in linea) casting her Shadow upon the Moon, and thereby depriving her of the Sun's Light, which may be more or less, according to the Moon's Latitude.*

*Now it is to be observed, that in the Solar Eclipse, the Moon by her proper Motion in Longitude (from West to East) first enters upon the West Limb of the Sun; so that the Sun's Eclipse doth always begin on the West-side, and end on the East. But the contrary appears in the Lunar Eclipses, for her Motion (as I said before) being from West to East, the East part of her Body must necessarily first enter the Earth's shadow; and so her Eclipse always begins on the East-side, and ends on the West. The Sun is very seldom, but the Moon often totally Eclipsed. And the Eclipse of the Moon appears from all Parts alike, as to quantity and duration, and a Reduction for the difference of Meridians will shew the beginning, middle and end of any such Lunar Eclipse for any determinate Place on the Earth. But in Eclipses of the Sun it is not so, being at the same Moment of time less in one Place than another, in one Part of the Earth Total, in another Part thereof no Eclipse at all; which is all caused by the Moon's vicinity to the Earth, and sudden Changes of her Parallax in Longitude and Latitude. An instance of which we had in 1715. in the great and visible Eclipse of the Sun; whereas at Liverpool in Lancashire, they had a small Tract of Light on the upper part of the Sun's Body; in all the Middle parts of England it was Total; at Paris in France, they had the lower part of the Sun's Body enlightened; all which*  
Appear-

To the Sons of Urania:

*Appearances are caused by the Moon's Parallax above mentioned.*

But to return to my Task in hand: The ensuing Treatise, which I have entituled, A Treatise of Eclipses, is a Calculation de novo, wherein I have spared neither Time nor Pains to make the Work serviceable not only to the Ingenious, but also to the Ignorant; for having but this small Tract about you, you may in a Minute tell any one how many Eclipses will be in any Year to 1741. with the just time and quantity of each: All which I have Calculated for the Meridian of the famous City of London.

Whether or no I have had great Pains in its Calculations, either in the Eclipses, or Conjunctions, he shall only know, that shall attempt to do the like. I have Typified all that will be visible at London, at the middle time of such Eclipse, and when the Luminary happens to Rise or Set Eclipsed, you will see there by a particular Type how much of the Luminary is then obscured: And if any one ask why I did not put the Minutes to the Cusps of the Houses, in the annexed Schemes; I answer, that the Degrees alone are sufficient in a Work of this Nature. Now my only aim in this Treatise, is to instruct the Ignorant, who either loves, or desires to be taught the Knowledge of these things; to whom I wish all prosperous Success in this and all other honest Endeavours; and for whose Sakes I confess my self to remain a Servant to all the true Lovers of Art.

Charles Leadbetter.

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*Upon my Ingenious and much  
Hon<sup>d</sup> Friend Mr. Charles  
Leadbetter his Treatise  
of Eclipses.*

**G**reat \* *Cronton's* Glory! oh, that I could raise  
A Monument might magnifie thy Praise,  
But that's an *Herculean* Task, yet thine  
Own Works have done it, thus thy Praises shine  
Best from thy own Atchievements; but lest I  
Shadow thy Praise, with my obscurity,  
I will be Silent; Let who will aspire  
To speak thy Praise, I rather will admire  
Thy matchless Arts; that makes thee soar so high  
To know the Language of the sparkled Sky:  
You can resolve before we need to ask  
When *Sol* puts on pale *Luna's* shady Mask,  
You tell us of Extremes, both Cold and Hot,  
And when the *Moon* will wear a beauty Spot;  
Observ'st their order, what News there thou hears,  
Thou tell us all the Wonders of the Spheres;  
Thy boundless Skill, with such unmated Glory  
Hath Crown'd thy Name, that it's a living Story,  
Of thy great Worth, which may be well enroll'd  
Not into Paper, but rich Leaves of Gold.

*George Nickolls, Philom.*



Carmen Acrosticon in  
laudem Authoris.

**C**ould I but Write, as well as thou hast done,  
Here the Eclipses both of Moon and Sun,  
And tell as well when Jove conjoyn'd will be  
Rising or Setting with swift Mercury;  
Lying in Combust or in Luna's way,  
Entering his Mansion house, or when astray,  
Should be the only Work I would display.  
Let all be Silent then, and hear him tell  
Every Conjunction, be they ill or well;  
Admire then, the Planets constant Race,  
Do only view their Figure and their Place;  
By which you may be able to foresee,  
Every Punctilio of this Mystery;  
Th' admired Rustick sure at this will fancy,  
That these Predictions are from Nigromancy;  
Exquisitely he shews here by his Pen,  
Rare News of the Creator's Will to Men.

W. Parr, Amator studiorum.



## ERRATA

What Errors have escaped the Press, the Reader is desired to Correct as follows.

Page 2. lin. 11. for 13 deg. r. 43 deg. lin. 30. for *Nonagesima* r. *Nonagesima* deg. v. p. 3. l. 15. r. *Nonagesima* deg. v. pag. 4 above the Type read

Lat. D seen at	{	Beginning End	{	<i>m.</i> 5.	{	North Ascending.
				0 3		
				2 31		

And in the Type of the *Sun's* Eclipse, April 22. 1715. the Rays of the *Sun* ought not to appear in the *Moon's* Body above. In the Scheme, p. 5. house 11. for  $\text{♄}$  20 40. r.  $\text{♄}$  20 40. and on the Cusp of the 2d for  $\text{♄}$  r.  $\text{♄}$  p. 8 in the Scheme before the Cusp of the 2d, r.  $\text{♄}$  10. and on the Cusp 2d r.  $\text{♄}$  16. and strike out v. on the Cusp 1d. r.  $\text{♄}$  11. before the Cusp 4th. read  $\text{♄}$  18. and in the same house strike out  $\text{♄}$  25. on the Cusp 4th. r.  $\text{♄}$  22. and on the Cusp 5. r.  $\text{♄}$  25. and strike out 81  $\text{♄}$  and  $\text{♄}$  11. on the Cusp of the 8th r.  $\text{♄}$  16. and before the same Cusp r.  $\text{♄}$  10. p. 9. in the Type, the two Stars A and B ought to touch the  $\text{♄}$ , and l. 29. for  $\text{♄}$  16 *m.* 105. r.  $\text{♄}$  16 deg. 10 *m.* p. 15. l. 27. r. Time of Incidence or half duration 1 h. 54 *m.* 32 s. and l. 29. r. 48 *m.* 33 s. p. 19. in Scheme in the Cusp 6 house, for *m* 5 r. *m* 5. and in the 5th house strike out  $\text{♄}$  5 44 29. p. 20. l. 29. for a Night. r. at Night. p. 21. in the Scheme, for  $\text{♄}$  20 in the 11th house, r.  $\text{♄}$  20. p. 24. l. 24. for continuation r. continuance. p. 25. l. 9. for one r. zone, and in the Scheme house 1 for  $\text{♄}$  r.  $\text{♄}$ , and in the 7 house for  $\text{♄}$  r.  $\text{♄}$  p. 28. in Scheme Cusp 19. for 28 r. 23 deg. and house 7. r.  $\text{♄}$  p. 30. l. 13. r. a square of  $\text{♄}$   $\text{♄}$  p. 31. l. 22. for falling read following. true  $\text{♄}$  p. 32. l. 9. r. *Sun's* place II 1 deg. 41 *m.* 21 s. and l. 15. r. Declination Culminating Point North; and l. 20. for 18 *m.* 48 s. r. 18 *m.* 49 s. p. 40. in the Ascendant r.  $\text{♄}$  21 R. P. 41. l. 3. for 53 s. r. 55 s. and in the Scheme r.  $\text{♄}$  direct. P. 43. in the Scheme r.  $\text{♄}$   $\text{♄}$  and  $\text{♄}$  12. P. 44. in the Scheme r.  $\text{♄}$   $\text{♄}$  and  $\text{♄}$  12. In the Scheme p. 58. strike out  $\text{♄}$  of the 7th house. P. 59. in the Year 1734. read both of the *Sun* invisible; and for 1733. read 1735. p. 62. l. 27. read Total Duration 3 h. 29 *m.* 36 s. P. 68. l. 13. read Altitude *Nonagesima* deg. 54 deg. 35 min. and line 14. for 28 read 26. P. 77. line 3. for Middle or greatest darkness r. True Ecliptick  $\text{♄}$ . and l. 4. for True Ecliptick  $\text{♄}$ . read Middle or greatest darkness.

# A Treatise of Eclipses.

Of the ECLIPSES this Year, 1715.



OUR Times to the Inhabitants of this Teraqueous Globe, will the two great Luminaries suffer Eclipse, twice the Sun, and as often the Moon; only two conspicuous to the Inhabitants of Great-Britain; they happen in the following Order.

The first is a Great and Total Eclipse of the Sun, on Friday, the 22d. Day of April, (it being Alchurch New Fair-day) at 9 a-Clock in the Morning; a Synopsis of the Calculation follows.

The Meridian of London, April, 1715

	D.	H.	M.	S.
Equal Time of true $\odot$	21	21	22	5
Sun's true place $\gamma$		12	14	24
Orbite place $\zeta \gamma$		12	14	24
Mean Anomaly $\odot$	10	2	55	42
Mean Anomaly $\zeta$	6	19	32	57
North Node subtract	7	20	42	10
Argument Latitude	5	21	34	14
Moon's Latitude North Descending			43	55
Reduction add			1	53
Ecliptick place Moon $\gamma$		12	16	17
Hourly Motion $\zeta a \odot$			35	26
Horizontal Parallax $\zeta a \odot$		1	0	4
Time of Reduction subtract			3	12
True Ecliptick $\odot$	21	21	18	54
Equation of Time add			9	50
Apparent Time at London	21	21	28	44
Difference Meridians subtract			8	40
Apparent Time at Alchurch	21	21	20	44

A

Sun's

	D.	H.	M.	S.
Sun's true place $\gamma$		12	14	17
Right Ascension of the Sun		39	47	21
Apparent time $a$ Noon in Deg. & Min.	320	11	0	
Right Ascension Medium Cœli	359	58	21	
Complement			1	39
Medium Cœli in Ecliptick $\times$	29	56	21	
Declination Medium Cœli South			1	23
Meridian Angle	66	30	0	
Altitude Equator at <i>Alchurch</i>	37	35	0	
Altitude Medium Cœli	37	33	37	
Altitude Nonageffima deg.	13	22	3	
Distance Medium Cœli $a$ Nonageffima	27	24	29	
Nonageffima degree in $\vee$	27	21	0	
Distance Sun $a$ Nonageffima degree	14	53	17	
Parallax $a$ $\odot$ in Longitude			10	36
Parallax $a$ $\odot$ in Latitude			43	40
To 1 Hour before true $\delta$ viz.	21	20	20	44
Sun's true Place $\gamma$		12	11	52
Right Ascension of the Sun		39	44	57
Apparent Time $a$ Noon in Degree	305	11	0	
Right Ascension Medium Cœli	344	55	57	
Complement		15	4	3
Medium Cœli in Ecliptick $\times$	13	38	24	
Declination Medium Cœli South	6	26	54	
Altitude Equator at <i>Alchurch</i>	37	35	0	
Altitude Medium Cœli	31	8	6	
Meridian Angle	67	21	47	
Altitude Nonageffima Degree	37	49	6	
Distance Medium Cœli $a$ Nonageffima	32	30	58	
Nonageffima Degree	16	9	22	
Distance Sun $a$ Nonageffima Degree	26	2	54	
Horizontal Parallax $a$ $\odot$	1	0	4	
Parallax $a$ $\odot$ Longitude		16	10	
Parallax $a$ $\odot$ Latitude		47	27	
Hourly Motion $a$ $\odot$		35	26	
Different Parallax Longitude subtract		5	34	
Visible Hour Motion $a$ $\odot$		29	52	
Interval of true and visible Conjunction subtract	21	18		
Apparent Time visible $\delta$	21	20	59	26

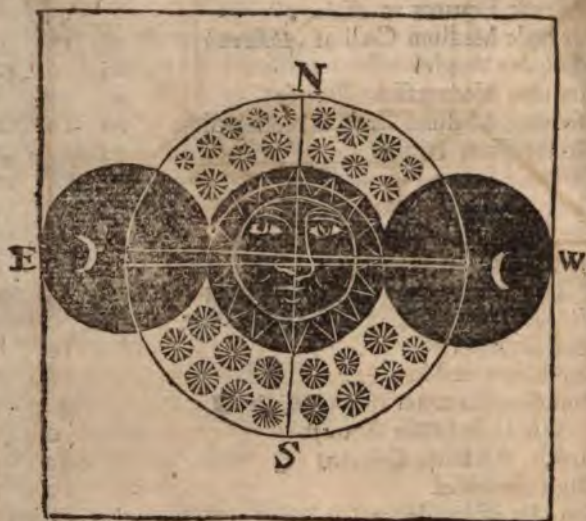
Sun

# A Treatise of Eclipses.

	D.	H.	M.	S.	
Sun's true Place $\gamma$		12	13	24	
Ecliptick Place $\text{C} \gamma$		12	0	37	
Distance $\odot$ and $\text{C}$			12	47	
Right Ascension Sun		39	46	4	
Apparent Time $\alpha$ Noon		314	51	30	
Right Ascension Medium Cœli		354	37	34	
Complement		5	22	26	
Medium Cœli in Ecliptick $\times$		24	8	36	
Declination Medium Cœli South		2	19	51	
Altitude Equator at <i>Alchurch</i>		37	35	0	
Altitude Medium Cœli at <i>Alchurch</i>		35	15	9	
Meridian Angle		66	56	33	
Altitude Nonageffima Degree		41	27	9	
Distance Medium Cœli $\alpha$ Nonageffima		29	19	21	
Nonageffima Degree		23	27	57	
Distance Sun $\alpha$ Nonageffima		18	45	27	
Horizontal Parallax $\text{A} \alpha \odot$		1	0	5	
Parallax $\text{C} \alpha \odot$ Longitude			12	47	
Parallax $\text{C} \alpha \odot$ Latitude			45	2	
$\text{C}$ True Latitude North Descending			45	23	
Visible Latitude $\text{C}$ North Descending			0	21	
Semidiameter Sun			16	8	
Semidiameter Moon			16	37	
Sum Semidiameter of the $\text{C} \& \odot$			32	45	
$\alpha$ Visible Latitude subtract			0	21	
Rest o' the Parts deficient			32	24	
Digits Eclipsed			12	3	
Scruples of Incidence			32	45	
Time of Incidence		1	4	24	
Time of Repletion		1	8	24	
Total Darkness			1	58	
Continuation of the Eclipse		2	12	48	
Hence	H.	M.	S.		
Beginning	7	55	27	} in the Morn	
Beginning of Total Darknefs	8	58	2		
Greatest Obscuration	8	59	26		
End of Total Darknefs	9	0	25		
End of Eclipse	10	7	50		
At <i>Alchurch</i> , Friday, April 22, 1715.	But the Time				
at <i>London</i> is thus :	Hence				
	A 2				

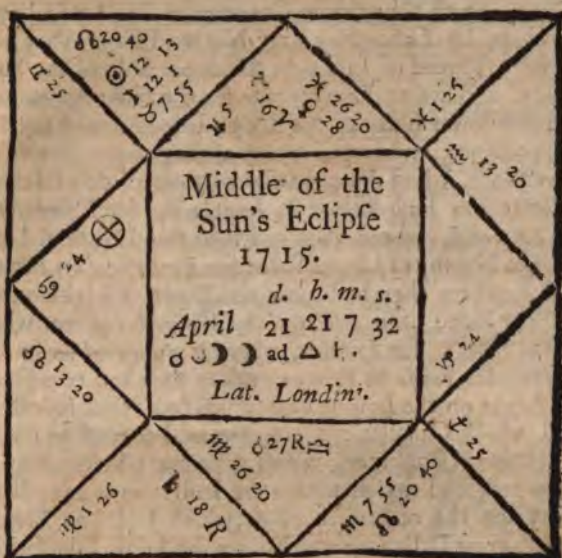
		D.	H.	M.	S.	P.M.
Hence the apparent Time at London of the	Beginning <i>April</i>	21	20	2	13	
	Middle	21	21	7	32	
	Visible Conjunction	21	21	7	42	
	End of the Eclipse	21	22	16	31	
	Total Duration		2	14	18	
Digits Eclipsed are		11	47	0		

The Type.



At the middle Time of this Eclipse it will be so dark, that the Stars may be seen, to the great Astonishment of many People: Three of the Primary Planets will be seen Westward of the Sun; first *Jupiter*, next the *Sun*, then *Mercury*, and lastly *Venus*; which two last are near the Meridian, and *Jupiter* near the Cusp of the 11th House; the 7 Stars, *Aldebrand* and *Orion* may all be seen toward the East; all which you may more plainly perceive by the Face of Heaven itself at the middle of the Eclipse, and Latitude of London.

This



This Eclipse happeneth in the 11th House of Heaven, which signifies Loss of Friends, and Frustration of Hopes; and being in the Earthy Triplicity, and *Ireland's* Ascendant, it foretells the Destruction of the Fruits of the Earth, and Scarcity of Corn and Fruit, and a Danger of a Raging Pestilence in those Places under ☾ and ♀; Frost, thick and foggy Weather, unwholesome Air, Banishment, Poverty, Misery, Death of great Cattle, and a Mortality of Old People; it stirs up Malice, Strife and Debate, and many Tedious Law-Suits; the Effects hereof will continue (according to the Rule of Astrology) until the 10th Day of *July*, Anno 1717.

This is the greatest Eclipse of the Sun that has happen'd in *England* since the Year 1652, which happen'd on *Monday* the 29th Day of *March*, about 10 in the Forenoon, which to this Day is called *Dark Monday*, that it was no where in *England* so great as this is;



for this Eclipse will be total, for about two Minutes of Time, in all the middle Counties of *England*; but at *Crofton* in *Lancashire* (my Native Place) they will have a Thread of Light on the upper Side of the Sun's Body, and we at *London* will see the same Appearance on the lower Side of his Body: this is a most unusual Appearance, and is well worth all Ingenious Men's Observations. I had done the Calculations of this Glorious Phenomena long before it happen'd, for *Edinburgh*, in *Scotland*, where they had near two Digits of Light on the North, or Upper Side; for *Liverpool* in *Lancashire*, where they had near one Digit of Light on the Upper Side; for *Aldurch* in *Worcestershire*, where it was total; For *London*, where it appeared as in this Type; for *Paris* in *France*, where they had two Digits of Light on the Lower, or South Side of the Sun's Body. All which Calculations and Types I shewed to several Ingenious Gentlemen, which gave great Satisfaction; I also provided myself with good Instruments against the Day for the observing of it, which I did at *London* with great Diligence and Nicety, and found the Beginning, Middle and End, and Digits dark, to appear as in the Calculation above. The Morning was very serene, and continued so all Day, so that we had a very good Opportunity of taking our Observations to the greatest Nicety imaginable. In the middle of the Eclipse the Air became so cold, (on a sudden) that it struck a Terror on all the Spectators, (especially on the vulgar Sort.) But as the Light increased, the Cold vanished, till the Morning return'd to its former Heat and Lustre. One of the Gentlemen that saw my Performance hereof, was so well pleased therewith, that in the Afternoon the same Day he made me a very handsome Present; for which I return him my hearty Thanks; and I think it had been a great Ingratitude in me if I had not mentioned thus much of it in this Place.

The second will be an Invisible Eclipse of the lesser Luminary the Moon, on the 7th Day of *May*, a Quarter past 12 at Noon, it will not be seen in any Part of *Europe*.

*Europe*, but our *Antipodes* will behold it near the Meridian, and 6 Digits, 25 Minutes of the Moon's Body on the South Side will be obscured. It falls in 26 Degrees of  $\pi$ , and in the 4th Hou'e of Heaven; but because this Eclipse will not be seen in *England*, I shall not say any Thing on the Effects thereof.

The Third will be an Invisible Eclipse of the Sun, on *Saturday* the 16th Day of *October*, 6 Minutes past 9 a-Clock in the Morning; and if the Air be clear at that Time, it will not be seen in any Part of *Great-Britain*, by Reason of the Moon's great South Latitude, which being augmented by her Parallax of Latitude, depresseth the Moon below the Sun's Limb, which plainly proves it cannot be seen at *London*; but in the more Southern Parts of the World it will be seen.

The Fourth and Last Eclipse is of the Moon, and visible, on *Monday* the 31st. Day of *October*, in the Morning, according to the following Calculation.

		D.	H.	M.	S.		
Hence the apparent Time at London of the	{	Beginning is <i>October</i>	30	1	14	48	} P. M.
		Greatest darkness		16	33	45	
		Middle or true Ecliptic	8	16	39	32	
		End of the Eclipse		17	52	48	
		Total duration		2	38	0	
	{	Digits Eclipsed		7	49	0	

The Type.



This Eclipse falls in 18 degrees of *Taurus*, within 6 degrees of the great Eclipse of the Sun before-mentioned.



oned, which aggravates the Mischiefs there threatned; *Hermes* tells us, that when both the Lights are Eclipsed in one Month, as they are here, there shall then be many Troubles happen in the World, and especially in such Places where there is a particula Signification of them. *Aphorism* 53. and at the middle time of this Eclipse, the Heavens will be posited thus.



This Eclipse falls in the 8th House of Heaven, in conjunction with *Jupiter* Retrograde, and in Opposition to *Venus*, in the second House; this shews the death of some great Lady, as also Mischief to the vulgar People, marry'd Women, and Travellers.

Besides these 4 Luminary Eclipses, there will be a most Glorious *Phenomena*, or an Eclipse of the Planet *Jupiter*, caused by the Interposition of the Moon's Body between him and our Sight, on the 24th day of *December*, in the Evening, according to the following Calculation.

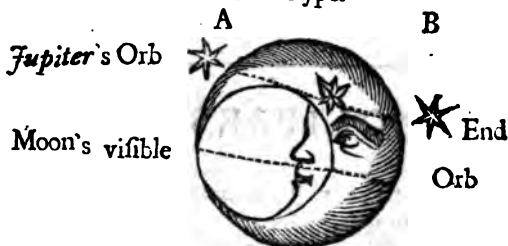
Hence

# A Treatise of Eclipses.

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Hence the apparent Time at London of the	}	Beginning 1715, Dec.	H.	M.	S.	}	P.M.
		Visible. $\phi$	24	8	33		
		End	8	54	16		
		Total duration	9	15	10		
			41	48			

The Type.



At the time of this Conjunction the Moon is very near the point of her *Perigæon*, her Motion is now very swift, and her Diameter great; the Moon is 10 days old, and consequently if the Air be clear will shine very bright; at 55 Minures past 7 at Night she is in the Meridian or full South, and then you will see that Star a little to the left; and at 33 *m.* 22 *s.* past 8 at night the Moon will appear to touch the Star, as at *A*, and in a very short Space of time you will see the Star quite cover'd, which will continue so for the Space of 41 *m.* 48 *s.* and at 15 *m.* 10 *s.* past 9 at night, the Moon will leave the Star to the Right, and they will appear as at *B* in the Type above. I have not met with any Author that has given any Account of the effects of the Eclipses of the Planets, which I think there is more Reason for, than there is for the Eclipse of the Luminaries, because such Appearances happen but seldom, and if you please to give me leave, I will give you a Word or two of my Opinion of it. First then, *Jupiter* signifies the Clergy, and the Moon the common People, the Sign this unusual Appearance falls in is  $\pi$  16 *m.* 10 *s.* the Ascendant of *Ireland*, and the Planet *Jupiter* at this time is Retrograde, this falls in the same Sign, and within a few degrees of the two visible Eclipses before-mentioned.

B

mention'd; now you know a threefold Cord is not easily broke, these things all put together look with a very sower face upon *Ireland*, &c. as if the Clergy there would be forced to play at Bo-peep, and leave their Religious Houses for their Conscience-sake; so I shall leave all for time to determine, and conclude my Account of the Eclipses for this Year 1715.

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## Of the ECLIPSES in 1716.

**I**N this Year there will be only two Eclipses, and both of the Sun, invisible.

The first Eclipse happeneth on *Wednesday* the 11th of *April*, 19 m. past 2 in the Morning, in 2° of the Cælestial Bull, the Sun at that time is under the Earth, proves the Eclipse invisible at *London*.

The Second Eclipse this Year is also of the Sun, and falls on *Thursday* the 4th day of *October*, at 32 m. past 10 a-Clock in the Forenoon, and if the Air be clear at that time it will not be seen at *London*, by reason of the Moon's South Latitude which is at that time 2 deg. 13 m. S. D. this happeneth in 22 deg. of the Cælestial Balance; and because these Eclipses are both invisible in *England*, I shall not trouble my self nor the Reader with any Account of their effects. On the 24th day of *November* this Year there happeneth a famous ☿ of the two Infortunes *Saturn* and *Mars* in 18 deg. of *Libra*; they are then Morning-Stars.

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## Of the ECLIPSES in 1717.

**F**OUR times this Year will the two great Lights of Heaven come within the Ecliptick Boundaries; twice the Sun, and as often the Moon; they happen in the following Order.

# A Treatise of Eclipses.

11

The first will be an Eclipse of the Moon, and visible on *Saturday* the 16th day of *March* in the Morning, according to the following Calculation.

		d.	h.	m.	s.	
Hence the apparent the {	Begin. is	17	17	March	15	13 43 37
	True Ecliptick					14 54 9
	Middle, or great darkness				15	0 37
	End of the Eclipse				16	17 37
	Total duration				2	34 0
	Digits Eclipsed				6	31 0
						P. M.

The Type.



This Eclipse falls in 6 deg.  $\approx$ , and in the 8th House of Heaven, and Authors tell us, that it signifies a sickly Air, and that Corn will be dear, with Tempests of Hail, and Rain; danger to Woman in Child-bed, and the Application of  $\text{♂}$  to  $\text{♀}$  in the 8th, shews the death of many aged People.



The second is an invisible Eclipse of the Sun, on *Sunday* the 31st day of *March* at 3 a-Clock in the Afternoon; but not to be seen in *England*, by reason of the Moon's great South Latitude  $44^m. 17^s$ . which being augmented by her Parallax of Latitude, proves it cannot be seen in these Northern parts of the World.

The third Eclipse happeneth on *Monday* the 9th day of *September*, and is of the Moon, the Beginning whereof will not be seen at *London*, but the middle and end, will be seen here as is proved by the following Calculation.

	d.	h.	m.	s.	
Hence the apparent time at <i>London</i> of the	Beginning is 1717, <i>Sept.</i> 9				
	True Ecliptick 8				
	Middle or greatest darkness				
	End of the Eclipse				
	Total duration				
	Digits Eclipsed are				
		4	42	18	P. M.
		5	58	23	
		6	4	46	
		7	27	14	
		2	44	56	
		7	0	0	

# The Type.

The Moon



riseth nearly thus.

This Eclipse is made in  $27^{\circ}$  of  $\times$ , and falls in the 12th House of Heaven; this signifies Sedition, Cruel and Inhumane Actions of Soldiers, Sea-Fights and death of Fish, great Floods of Water, death of vulgar People; and being in the 12th House, it foreshews Sorrow and Imprisonment to the common sort of People, and the death of great Cattle, as Oxen, Horses, Hogs, &c. the Places under the Eclipsed Sign, are *Portugal, Galicia, Cilicia, Egypt the higher, Normandy, &c.* Cities, *Alexandria, Worms, &c.* the Face of Heaven at that time will be thus.



This



This Eclipse begins in the first House of Heaven, and ends in the 11th; if the Air be clear that night you will see the Moon rise Eclipsed, nearly as the Type above sheweth; for she riseth at *London* that night 3 m. 46 s. before the greatest darkness, at which time (nearly) the Sun sets.

The fourth and last is an Eclipse of the greater Light of Heaven the Sun, on *Monday* the 23d. day of *September*, at 50 m. past 6 at night; the Sun is set e'er the Eclipse begins, so not visible in *England*; but in the Western Parts of the World it will be seen, and will be very great to those that sail on the Western Ocean.

### *Of the ECLIPSES in 1718.*

**SIX** times this Year will the two Luminaries come within the Ecliptic Boundaries; four-times the Sun, and twice the Moon, only one of the Moon part visible; they happen in the following Order.

The first is an Invisible Eclipse of the Sun, on *Wednesday* the 19th of *February*, half an hour past 6 in the Morning, it will be seen in the North-East parts of the World. It is made in 11° of the Cœlestial Fish.

The Second will be a Lunar defect, on *Wednesday* the 5th day of *March*, at 3 a-Clock in the Afternoon, and so not to be seen at *London*, because the Eclipse endeth before the Moon riseth; it happeneth in 26° of the Cœlestial Virgin.

The Third is a Solar Deliquium, and happeneth on *Thursday* the 20th day of *March*, at 11 a-Clock at Night, and so not to be seen in these parts of the World. It falls in 11° of the Heavenly Ram.

The Fourth is also a Solar defect, and will be on the 15th day of *August*, at one a Clock in the Morning, it being *Friday*, and the Assumption of the Blessed Virgin; it will not be seen in any part of Europe.

The

# A Treatise of Eclipses.

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The Fifth is a total and part visible Eclipse of the Moon, on *Friday* the 29<sup>th</sup> day of *August*, in the Afternoon, according to the following Calculation.

	D.	H.	M.	S.
Eq. time of true $\delta$ at <i>London, Aug.</i> 29	7	59	38	
Mean Anomaly Sun	2	10	43	27
Mean Anomaly Moon		9	56	6
Place of the Sun from the Earth	$\pi$	16	37	35
Place of the Moon in her Orbit	$\pi$	16	37	35
North Node subtract	$\pi$	15	46	56
Argument Latitude	6	0	50	39
True Latitude Moon South Ascending			4	24
Reduction subtract				12
Time of Reduction add				26
Correct time of true $\delta$ at <i>Lond. Aug.</i> 29	8	0	4	
Equation of time subtract			4	19
Apparent time of true Eclip. $\delta$ <i>Aug.</i> 29	7	55	45	
Hourly motion $\gamma$ a $\odot$			27	16
Sum Horizontal Parallax $\odot$ and $\gamma$			53	32
Semidiameter $\odot$ subtract			16	10
Rest Ap. Semidiameter Earths shadow			37	22
Semidiameter Moon add			14	52
Sum			52	14
Moon's true Latitude subtract			4	24
Rest Scruples deficient			47	52
Scruples of Incidence			52	3
Time of Incidence, or half duration			54	32
Scruples of half continuance in total darknes			22	4
Time of half continuance in total darknes			48	53
Interval, of $\delta$ , and greatest obscuration subtract	0			48
	D.	H.	M.	S.
Hence the apparent Time at <i>London</i> of the { Beginning 1718. <i>Aug.</i> 29	6	0	25	
{ Beginning total dark	7	6	24	
{ Middle, or great dark	7	54	57	
{ True Ecliptic $\delta$	7	55	45	
{ End of the total dark	8	43	30	
{ End of Eclipse	9	49	29	
{ Continuance of total dark	1	37	6	
{ Total Duration	3	49	4	
{ Digit $\gamma$ Eclipsed	19	18	19	

P.M.

Lat.



M. S.

Lat. 1 at { Beginning 0 32 North descending.  
 End 9 21 South ascending.

The beginning of this Eclipse will not be seen at *London*, for it begins 37 M. 25 S. before the Moon riseth, and at her rising she will appear thus much Eclipsed.

The Type.



*Note*, The Moon doth not rise that Night till 6 hours 28 min. and the Sun setteth at *London* at 6 hours 27 min. and at 1 hour 26 min. 57 sec. after the Moon is risen, she will appear totally Eclipsed, as this Type plainly sheweth.



At the middle time of this Eclipse 6 deg. of *Taurus* is on the Cusp of the Eastern *finiter*, 15 deg. of *Capricorn* culminates, *Venus* and *Jupiter* are in the fifth, and *Saturn*, *Sun*, *Mars*, *Mercury* and *Dragon's-Head*, all crowded in the sixth; the Eclipsed Moon falls near *Dragon's-tail* in the 12th House, in the second Decanate or face of *Pisces*, *Jupiter* Lord thereof under the Earth, which denotes such Persons signified by *Jupiter* to be of high Minds, lofty Dispositions, aiming at things out of their reach; it signifies the Death of  
 many

many of them; Earthquakes, and mischief to Fish. The Eclipse begins in the Ascendant, and ends in the 11th House of Heaven. The Places subject to the Eclipsed Sign *Pisces*, are *Portugal, Galatia, Egypt* the higher, *Lydia, Pamphylia, Calabria, Normandia, Lusitania*: Cities and Towns, *Alexandria, Compofstella, Sibilis, Worms, &c.*



The Sixth and last will be an invisible Eclipse of the Sun, on *Saturday* the 13th day of *September*, at 7 in the Morning; and altho' the Sun is then an hour high, yet the Eclipse will not be seen at *London*, by reason of the Moon's great North Latitude, but in *Poland, Swedeland, &c.* and by such as Sail in the *Baltick Sea*, and within the *Artick Circle*, will see the same. And so I shall conclude my account of the Eclipses for the Year 1718.

## Of the ECLIPSES which will happen in 1719.

FOUR times to the Inhabitants of this Terraqueous Globe, will the two great Lights of Heaven be Eclipsed, twice the Sun, and as often the Moon, and only one of the Moon will be seen at *London*: They happen as followeth.

The first Eclipse is of the Sun, and will be on *Sunday* the 8th day of *February*, 30 min. past 5 in the Morning; it will not be seen at *London*, because the Eclipse ends 4 min. before the Sun rises; in the Eastern parts of *Germany*, it may be seen if the Air is clear, and in the Parallel of 51 deg. 32 min. N. there will be 7 deg. 35 min. of the Sun's Body Eclipsed on the South side thereof: This Eclipse falls in the very beginning of *Pisces*.

The Second is an invisible Eclipse of the Moon, on *Monday* the 23d Day of *February*, at 8 a Clock in the Morning; the Moon sets before the Eclipse begins, so 'twill be only seen in the Western parts of the World. It is made in 15 deg. of *Virgo*.

The Third Eclipse is of the Sun, and invisible, on *Tuesday* the 4th day of *August*, at 5 a Clock in the Afternoon; it will not be seen at *London* by reason of the Moon's great South Latitude, which is augmented by her Parallax in Latitude; it may be seen at the *Cannaries* Islands, and at the adjacent Places. It falls in 22 deg. of *Leo*.

The Fourth and last Eclipse this Year will be a partial and visible (if the Air is clear) Eclipse of the Moon, on *Tuesday* the 18th day of *August* in the Evening, according to the following Calculation.

	D.	H.	M.	S.	
Hence the apparent time at <i>London</i> of the	Beginning 1719. Aug.	18	7	38	12
	Middle, or great dark		8	37	36
	True Ecliptic &		8	45	45
	End of the Eclipse		9	57	0
	Total Duration		1	58	48
	Digits Eclipsed are		3	9	0

The



*A Treatise of Eclipses.*  
The Type.

19



This Eclipse falls in the first Face of *Pisces*, near the Body of *Mars*; it causeth Shipwracks, unfortunate Navigations, Drought of Rivers, and loss of Friends.



*Of the ECLIPSES in 1720.*

**I**N this Year 1720. there will be only two Eclipses, and both of the Sun, invisible.

The First will be on *Thursday, January 28.* at 10 in the Forenoon; it will not be seen at London, because

cause the Moon's Latitude is then South, which being augmented by her Parallax of Latitude, depresseth her below the Sun's Limb. It falls in 19 deg. of *Aquaries*.

The Second will be on *Sunday* the 24th day of *July*, at 4 in the Morning; the Eclipse will be but small in itself, and therefore over e're the Sun riseth. It falls in 12 deg. of *Leo*.

The one of these Eclipses happeneth before the Sun's *Apogee*, and the other after, is the reason (according to the Laws of Astronomy) there will be no Eclipse of the Moon this Year.



Of the ECLIPSES this Year. 1721.

SIX times this Year will the Sun and Moon be Eclipsed, three times the Sun, and as often the Moon; they happen as followeth.

The first will be an invisible Eclipse of the Moon, on *Monday* the 2d day of *January*, at 3 in the Afternoon; the Eclipse is just over before the Moon riseth; it happeneth in 23 deg. of  $\odot$ .

The second Eclipse is of the Sun, and will be on *Monday* the 16th day of *January*, about 8 a Clock a Night; this will only be visible to the South-West parts of the World; it happeneth in 8 deg. of *Aquaries*.

The third is an invisible Eclipse of the Moon, on *Wednesday* the 28th day of *June*, at 8 in the Morning; the Moon is set before the Eclipse begins. It falls in 17 deg. of *Capricorn*.

The fourth will be a small Eclipse of the Sun, and visible, if the Air be clear; it happeneth on *Thursday*, *July* 13. in the Forenoon, according to the following Calculation.

	d.	h.	m.	s.	
Beginning 1721. <i>July</i>	12	19	1	34	P.M.
Middle, or great darkness	19	45	8		
Visible &	19	45	48		
End of the Eclipse	20	21	52		
Total duration	1	20	18		
Digits Eclipsed	1	35	0		

Hence the apparent  
time at London of  
the

The

*The Type.*



This Eclipse will be but very small in itself, therefore we cannot expect any great Effects therefrom; it falls in the beginning of the Regal Sign *Leo*, and in the 11th House of Heaven, signifies the Death of a Mighty Prince, violent Mischief, Cruelty and Toil, a scarcity of Corn and Fruit; Murders, Thefts, Abortions to Women with Child.



# A Treatise of Eclipses.

The fifth Eclipse is of the *Sun* also, but invisible; it happeneth on *Friday* the 8th day of *December*, at one a Clock in the Morning, in 27 deg. of *Sagittarius*; it will be seen by our *Antipodes*, and also by such as Sail in the Pacifick Ocean.

The sixth and last is a total, and part visible Eclipse of the *Moon*, on *Friday* the 22d day of *December*, in the Afternoon, as followeth.

		d.	b.	m.	s.		
Hence the apparent time at London of the	{	Beginning <i>December</i>	22	0	32	51	P.M.
		Beginning of total dark		1	38	32	
		Middle, or great dark		2	27	23	
		True Ecliptick &		2	27	41	
		End of total darkness		3	16	14	
		End of the Eclipse		4	21	55	
		Continuance total dark		1	37	42	
		Total duration Eclipse		3	49	4	
	{	Digits Eclipsed are		20	17	0	

This Eclipse you see begins 32 min. 51 sec. past Noon, and the Moon doth not Rise that Night till 10 min. past 3; so you see that a great part of the Eclipse is over before the Moon Riseth; she will Rise Eclipsed thus:







This Eclipse falls in the 2, 1 and 12 Houses of Heaven, and in the 12th deg. of *Cancer*. This stirs up many Infirmities in the common People, which often times proves Mortal; the Seas are infested with Pirates, by which the Merchants receive much Loss and Damage in their Adventures; It also betokens Inundations, or an overflowing of the Sea-banks; and that Women will often (as well as the Sea) go beyond their limited Bounds. The Places concerned in the Effects of this Eclipse, are *Scotland, Holland, &c. York, St. Andrew, Amsterdam, Venice, Constantinople, Lubbeck, Genoa, &c.*

On the 14th day of *July*, 1721, there happens an hateful Opposition of the two Superiours *Jupiter* and *Mars*, from *Aries* and *Libra*, in 27 deg. thereof; this puts forward the Effects of the *Sun's* Eclipse then beginning to operate.



*Of the Eclipses of the Sun and Moon that will happen in 1722.*

**T**HERE will be five Eclipses this Year, three of the Sun, and two of the Moon; the first two of the Sun will not be seen at *London*; they happen in the following Order.

The first Eclipse is of the *Sun*, on *Saturday* the 6th day of *January*, at 11 in the Forenoon, not visible by reason of the Moon's great South Latitude. It will only be seen in the Southern parts of the World.

The second Eclipse will fall on *Saturday* the 2d day of *June*, at 8 at Night; it is of the *Sun*, and invisible; it falls in 22 deg. of the Twins.

The third Eclipse is of the *Moon*, and visible, if the Air be clear, on *Monday* the 18th day of *June* in the Morning, as follows.

	<i>d.</i>	<i>h.</i>	<i>m.</i>	<i>s.</i>	
Hence the apparent time at <i>London</i> of the	17	12	19	50	Beginning Eclipse <i>June</i>
		13	31	8	Beginning total darkness
		13	56	37	Middle, or great darkness
		13	58	40	True Ecliptick 8
	14	22	6		End of total darkness
	15	33	24		End of the Eclipse
		50	58		Continuation total darkness
	13	13	34		Total duration
	13	32	0		Digits Eclipsed



This Eclipse will be total with continuance, and falls in 6 deg. of *Capricorn*, in the 8th House; this denotes

denotes Earthquakes, and the unhappinefs of eminent Men, Rebellion, and People will be addicted to Ramble, and to Sports of the worfer fort. Surely, if we would but obferve the hand of God, we may fee, that in all Ages he forewarns us by his Instruments; but we like stiff necked People, nothing regard God's handy Works; and tho' his judgments have a long time been in the Land, and great Calamities seem fill to imperd, yet one truly amends, nor Condoles our unhappy Differences, but still Covet for thofe things that perith.



The fourth Eclipse is of the Sun, and, if the Air be clear, will be part visible at London; it will be on Tuesday, November 27. in the Afternoon, viz.

	d.	h.	m.	s.	
Hence the apparent time of the	27	1	50	52	P. M.
{ Beginning November		2	58	17	
{ Middle		3	1	44	
{ Visible		4	1	20	
{ End of Eclipse		2	10	28	
{ Total Duration		59	47	0	
{ Digits Eclipsed					



The Type.



At 58 Minutes 17 Seconds past 2 in the Afternoon, the Suns Body will be near half dark'ned on the South side, as you may see by the Type above, and the Eclipse is not over when the Sun sets, as may be seen by this Type below.

Sun Sets thus  
at London.



November 27  
1722.

This



This Eclipse falls in 16 Deg. *Sagittarius*, and in the 7th House; in which there is no less than 5 of the 7 Planets with the *Dragons-tail*: This creates Troubles and Crosses to the Commonality, stirs up many tedious Law-suits, and many Differences are like to arise amongst married People; it also denotes the Motion of Armies, Wars, effusion of Blood, detriment to Noble Men, Murders, Thefts, Robbers on the High-ways, Depopulations, Abortions to Women with Child, Malignant Fevers, Destruction to Horses. The Effects of this Eclipse in particular falls on *Spain, Hungary, Arabia, Falix, &c.*

The fifth and last Eclipse falls this Year on *Tuesday December 11*, and is a partial Eclipse of the *Moon*, the beginning whereof will not be seen at *London*; but if the Air is clear, the Middle and End will be seen: It is in the Afternoon, according to the following Calculation.

	d.	h.	m.	s.	
Hence the apparent time at <i>London</i> of the	Beginning	Dec. 11	2	22	45
	Middle		3	37	49
	True Ecliptick &		3	44	49
	End of the Eclipse		4	52	53
	Total duration		2	30	8
	Digits Eclipsed are		5	36	0

P. M.

The Type.



The Moon Riseth nearly thus

December, 11, 1722.

This Eclipse falls in the Ascendant, and in the very beginning of the Tropical Sign *Cancer*: It stirs up Vexations and Troubles to young Women, plenty of Showers, and over-swelling of Rivers; with many sudden alterations of the Air. The Common-People are afflicted both in Body and Mind, the principal Significator of this Eclipse is the *Moon*, she being both *Lady of the Sign* and House where the Eclipse is made: *Scotland* is threat'ned.



Besides these 5 Luminary Eclipses, there will be a most unusual Conjunction of the 3 Superior Planets ♃ and ♄ in 24 Deg. 7; the true ♂ of ♄ and ♃ happeneth on Thursday the 27th Day of December, 4 min. past 8 a-clock at Night, in 23 Deg. 41 Min. 10 Sec. of 7; Saturn has then 1 Deg. 8 Min. 6 Sec. North Lat. Descended; and Jupiter's Latitude is 21 Min. 44 Sec. North descending also; so that Saturn will be Elevated 46 Min. 22 Sec. above Jupiter. And at the same time, Mars is in Sagittarius 22 Deg. 39 Min. 56 Sec. with 23 Min. South Lat. ascending. If the 28 Day of December 1722 be a clear Morning, I desire all Ingenious Persons to cast their Eyes upon the South-East Horizon, at 21 Min. past 6, they will then see Saturn Rising, and about a Minute after, you will see Jupiter Rise; and about 6 Min. after Jupiter, you will see Mars Rising; the like Appearances has not happened

happened in the Memory of Man; and, perhaps, the like may not happen any more. The Planets are all direct and swift in Motion; for several Mornings before and after this, you may see these three grand Wheels of the Cœlestial Clock-work Rise near together, pleasant to behold; the Effects of which will be terrible to those Kingdoms, Cities and Men unto which they belong. Now give me leave to acquaint you that are not *Astrologers*, That there are three sorts of Conjunctions of *Saturn* and *Jupiter*; which, in *Latin*, they term *Maximam*, viz. the greatest; *Mediam*, viz. the mean or middle; *Minimam*, viz. the least of all; where Note, That the greatest *Conjunction* is made in about 794 *Years*, and 331 *Days*; and the middle *Conjunction* is performed in about 198 *Years*, and 261 *Days*; and lastly, the little *Conjunctions* are performed in about 19 *Years*, 318 *Days*: Then, about the 29 and 30 *Days of December*, in the Morning, at their Rising, will appear thus.

Here is Work cut out for the Scriblers of our times, enough to fill a whole Volume, which I shall leave for them to treat on in particular, and only add, this *Conjunction* denotes high Differences between Christian

\* *Saturn.*

\* *Jupiter*

*Horizon.* \* *Mars.*

Kings and Princes, their Kingdoms and Monarchies much afflicted, Commotions, Wars, Seditions, Treasons, alteration of Laws and Customs, strange Apparitions, prodigious Meteors, Plagues, Scarcity and Desolation, the Death of Great Men, which will be occasion'd by Wars; because *Mars* (which signifies Wars) is close in Counsel with *Saturn* and *Jupiter*: Many remarkable Things, which the narrow Limits I am confin'd to, will not allow me room to mention at present.

Of



Of the ECLIPSES which will happen this Year, 1723.

**T**WO Eclipses only this Year, and both of the Sun, Invisible.

The First will be on *Thursday* the 23<sup>d</sup> Day of *May*, at 4 in the Morning; not to be seen in *England*, by reason of the *Moon's* South Latitude.

The Second Eclipse is of the *Sun*, on *November* 16 at 9 at Night, and therefore Invisible; it happens in 5 Degrees of *Sagittarius*.

On the 3<sup>d</sup> of *May*, there happens a hateful *Square* of *Saturn* and *Mars*, from *Sagittarius* and *Pisces*; and on the 14<sup>th</sup> of the same Month, a *Square* of *Mars* from *Capricorn* and *Aries*, the Effects of which will be very considerable, which I shall leave for Time to determine.

Of the ECLIPSES which will happen in 1724.

**I**N this Year 1724 there will be four Eclipses, two of each Luminary.

The First will be of the *Moon*, on *Monday April* 27, at 8 a-Clock in the Morning; it will not be seen in *England*, because the ☾ is Set before the Eclipse begins; it falls in 17 Degrees of *Scorpio*.

The second will be a great (and almost total) Eclipse of the *Sun*, on *Monday* the 11<sup>th</sup> of *May*, in the Afternoon, according to the following Calculation.

In the Meridian of London, 1724.	d.	h.	m.	s.
Equal time true ☿	May 11	5	7	30
Mean Anom. of the Sun		10	22	37
Mean Anom. of the Moon		6	29	40
Longitude of Sun and Moon		II	1	38
North Node substract		8	25	33
Argument Latitude		0	6	4
Moon's true Lat. North Ascend.				31
Reduction substract				1
Ecliptick place Moon	II	1	36	46
Hourly Motion ☾ a ☉			35	2
				Time

*A Treatise of Eclipses.*

31

	<i>d.</i>	<i>h.</i>	<i>m.</i>	<i>s.</i>
Time of Reduction add			2	19
True Ecliptick $\odot$ is <i>May</i>	11	5	9	49
Equation of Time add			8	30
Apparent time true Ecliptic $\odot$	11	5	18	19
Suns true Place	II	1	38	12
Right Ascension Sun		59	31	0
Apparent time from Noon add		79	34	45
Sum, Right Ascension M. Cœli	139	5	45	
Compliment		40	54	15
Medium Cœli in Ecliptic	$\Omega$	16	38	0
Declination Culminating point North		15	53	0
Meridian Angle		72	27	0
Altitude Equator at <i>London</i>		38	28	0
Altitude Midheaven		54	21	0
Altitude Nonagesima deg.		56	14	0
Dist. Midhea. $\alpha$ Nonagesim.		12	12	0
Nonagesima degree	$\Omega$	4	26	0
Dist. $\odot$ $\alpha$ Nonagesima	2	2	47	48
Horizontal Parallax $\gamma$ $\alpha$ $\odot$		59	43	0
Parallax Longitude $\gamma$ $\alpha$ $\odot$			44	9
Parallax Latitude $\gamma$ $\alpha$ $\odot$			32	12

---

At one Hour falling true $\odot$	11	6	18	19
The Suns place is	II	1	40	36
His Right Ascension		59	34	0
Apparent time from Noon		94	34	45
Sum, Right Ascension M. Cœli	154	8	45	
Compliment		25	51	15
Medium Cœli in Ecliptic	$\Omega$	2	9	0
Declination Culminat. point		10	44	0
Meridian Angle		68	58	0
Altitude Equator at <i>London</i>		38	28	0
Altitude Midheaven		49	12	0
Altitude Nonagesima deg.		52	25	0
Dist. Midheaven $\alpha$ Nonagesima		17	13	0
Nonagesima deg.	$\Omega$	14	56	0
Dist. $\odot$ $\alpha$ Nonagesima deg.	2	13	15	24
Horizontal				



	d.	b.	mi.	s.
Horizontal Parallax $\rangle a \bullet$			59	41
Parallax Longitude $\rangle a \bullet$			45	17
Parallax of Latitude $\rangle a \circ$			36	24
Hourly Motion <i>Moon a Sun</i>			35	2
Diff. Parallax Long. sub.			1	8
Visible hourly motion <i>Moon a Sun</i>			33	54
Interv. true and visible $\circ$ add		1	18	10
Visible $\circ$ 1724 <i>May</i>	11	6	36	29
Suns place	II	2	36	30
Right Ascension Sun		59	34	0
Apparent time $a$ Noon		99	7	15
Sum, Right Ascen. M. Caeli		158	41	15
Compliment		21	18	45
Medium Caeli in Ecliptic	III	6	57	0
Declina. Culminat. point		8	59	0
Meridian Angle		68	12	0
Altitude Equator at <i>London</i>		38	28	0
Altitude Medium Caeli		47	27	0
Altitude Nonagesima deg.		51	6	0
Dist. M. Caeli $a$ Nonagesima		18	48	0
Nonagesima deg.	II	18	8	0
Dist. $\circ$ $a$ Nonag. deg.	2	16	26	39
Horizontal Parallax <i>Moon a Sun</i>			59	41
Parallax Longitude <i>Moon a Sun</i>			45	9
Dist. of <i>Sun a Moon</i>			45	9
Parallax Latitude <i>Moon a Sun</i>			37	29
True Latitude <i>Moon North Ascend.</i>			36	18
Visible Latitude <i>Moon South</i>			1	15
Semidiameter <i>Sun</i>			16	3
Semidiameter <i>Moon</i>			16	34
Sum, Semidiameters			32	37
Visible Latitude sub.			1	15
Rest. parts deficient			31	26
Digits Eclipse are	11		45	0
Scruples of Incidence			32	36
Time of Incidence sub.			56	27
Time Repletion add			49	35
Interval between visible $\circ$ and the greatest darkness sub.		3	0	10

Hence

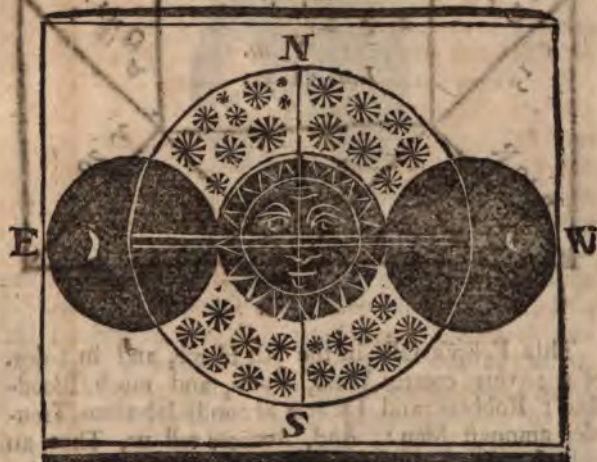
# A Treatise of Eclipses.

33

Hence the apparent  
time at London of  
the

	d.	h.	m.	s.	
Beginning 1724. May	11	5	39	52	P.M.
Middle, or great darkne's		6	36	19	
Visible ♂		6	36	29	
End of the Eclipse		7	25	54	
Total duration		1	46	2	
Digits Eclipsed are	11	45	0		

Lat. D Seen	{ Beginning	1 12	} South Ascend.
	{ End	1 14	
The Type.			



I would desire all Ingenious Gentlemen that are able, and fitted with proper Instruments, to Observe the same; and to communicate their Observations. Here you are to Note, That it will be greater in the Southern Parts of *England*, than it will be in *Lancashire*, &c. *Mars*, *Venus* and *Mercury* (besides many fixed Stars) will be seen.

This Eclipse will be very great and terrible to the beholders, in *England*; especially in the South Parts thereof, as at *Portsmouth*, &c. it will be near Total; but at *London* we shall have a Thread of Light on the North-side thereof, as you may the better perceive by the Type above.

E

This



This Eclipse falls in the 7th House, and in 1 deg. of  $\Pi$ ; this creates Wars, Duels, and much Bloodshed; Robbers and Pyrates abound; laborious Troubles amongst Men: And, Authors tell us, That an Eclipse of either Luminary, in the Airy Trigon, (as this is) stirs up Hurricanes, stormy Winds, pestilential Diseases, Death of Birds, or the Fowls of the Air. The Places likely to be concern'd in this Eclipse, are *Flanders, Brabant, Lombardy, Armenia, Barbadoes Island, London, Bamberg, Norinberg, Lorain, Cesena, Hasford, Bruges, Corduba and Mentz.* Thou, oh! Lord, hast taught me from my Youth up, untill now; therefore will I tell of thy wondrous Works, Psa. 71. 15.

The Third will be a Visible Eclipse of the Moon, on Wednesday the 21st of October, in the Morning, as followeth.

Hence

	D.	H.	M.	S.	
Hence the apparent time at <i>London</i> of the	20	14	52	55	P.M.
		16	2	51	
		16	8	53	
		17	24	51	
		2	31	56	
		7	4	0	

The Type.



This Eclipse falls in 8 deg. of  $\gamma$ , an Earthy Sign, and in the 8th House of Heaven; it denotes Damage to Witty and Learned Men, Merchants, Scribes, &c. dull Trading, a scarcity of the Fruits of the Earth, and the Death of great Cattle. Cast your Eye on the following Figure; and, there you'll see all the Planets are under the Earth, except the Moon, who is in the descending Part of Heaven, and  $\rho$  is near Rising in the East; the *Dragon's-tail* and *Mars* in the 3d House, denotes Misfortunes to Travellers.





The Fourth and last Eclipse, will be on *Wednesday*, *November 4* at 11 at Night ☉; and therefore Invisible in *England*; it falls in 23 deg. of  $\pi$ .

*Of the ECLIPSES of the Sun and Moon that  
will happen in 1725.*

**W**ITHIN the Perimeter of this Year, there will be six Eclipses, four of the Sun, and two of the Moon; only one Visible at *London*, and 'tis of the Moon; they happen in the following Order.

The first Eclipse is of the Sun, on *Friday* the 2d Day of *April*, at 2 a-clock in the Morning; it will not be seen in any Part of *Europe*: It falls in 23 deg. of the Cælestial *Ram*,

The

The second is an Invisible Eclipse of the Moon, on *Friday* the 16th Day of *April*, at 9 a-clock in the Morning; the Moon is Set before the Eclipse begins; it happeneth in 7 deg. of the *Bull*.

The third is of the Sun, Invisible; on the 1st Day of *May*, at 10 in the Forenoon: It will only be seen by such as Sail within the Artick Circle; it falls in 21 deg. of  $\gamma$ .

The fourth Eclipse is of the Sun also, and Invisible; on *Saturday*, *September* 25, at 7 in the Morning. This will only be seen in the Northern Parts of the World. This falls in 12 deg. of *Libra*.

The fifth is a great and Visible Eclipse of the Moon, on *Sunday* the 10th Day of *October*, in the Evening, according to the following Calculation.

	d.	h.	m.	s.	
Hence the apparent time at London of the					
Beginning <i>October</i>	10	5	29	7	} P.M.
Beginning of total darkness		6	27	25	
Middle, or great darkness		7	15	13	
True Ecliptick &		7	15	18	
End of total darkness		8	3	1	
End of the Eclipse		9	1	19	} P.M.
Continuance total darkness		1	35	36	
Total duration,		3	32	12	
Digits Eclipsed are		21	36	20	

The Type.



This



This Eclipse falls in 28 deg. *Aries*, and in the 11th House of Heaven; it signifies the Death of Women, Vexations and Sadness to many People, a general Rot amongst Sheep and Rabbits in *England*.

The sixth and last Eclipse is of the Sun, on *Sunday* the 24th Day of *October*, at 11 o'clock at Night, and consequently Invisible in *England* or any Part of *Europe*; it falls in 12 deg. *m*.

Besides these six Luminarian Eclipses, there will be a famous Conjunction of the two Maleficks, ♄ and ☿, in 15 deg. of ♄; it will be on the 5th Day of *January*; they are then Morning-stars, and near the Sun, so cannot be seen.

Of the ECLIPSES which will happen in 1726.

FOUR Eclipses this Year; two of the Sun, and two of the Moon.

The first is of the Sun, on the 22d Day of *March*, at 2 in the Afternoon, Invisible, by reason of the Moon's South Latitude. It falls in 12 deg. of *Aries*.

The second will be on *Tuesday*, the 5th Day of *April*, at one a-clock in the Afternoon, of the Moon, and Invisible; it falls in 26 deg.  $\approx$ .

The third is an Eclipse of the Sun, and part Visible, on *Wednesday* the 14th Day of *September*, in the Afternoon, as followeth.

	d.	h.	m.	s.	
Hence the apparent time at <i>London</i> of the	Beginning <i>September</i> 14	4	44	28	} P. M.
	Middle, or great darkness	5	37	44	
	Visible $\alpha$	5	40	21	
	End of the Eclipse	6	27	38	
	Total Duration	1	43	10	
	Digits Eclipsed	6	3	0	

The Type.



The Setting Sun will appear as this Type below sheweth. It will be well worth the Observation of all the Ingenious.

This





This Eclipse falls in 2 deg. of  $\pi$ , and in the 7th House; this (Astrologically) signifies a sickly Air, tempestuous Storms of Hail; and, that Corn will now advance its Price.

The fourth and last, is a partial Visible Eclipse of the Moon, on *Friday* the 30th Day of *September*, in the Morning, according to the following Calculation.

Hence

# A Treatise of Eclipses.

41

Hence the apparent  
time at London of  
the

	d.	h.	m.	s.	
Beginning	Sept. 29	15	53	16	P.M.
Middle		17	3	42	
True Ecliptick	8	17	10	53	
End of the Eclipse		18	14	8	
Total duration		2	20	52	
Digits Eclipsed are		4°	58	0	

The Type.



F

By

By the Scheme above, you see this Eclipse falls in the second Face of  $\gamma$ , and in the 7th House, denotes detriment to Noble Men, scarcity of the Fruits of the Earth; and *Mars*, being Lord of this Eclipse, stirs up much Mischief, Wars, Quarrels, Duels, Massacres,  $\text{E}^{\text{c}}$ . hot Air, Thunder and Lightning, little Rain, Ship-wracks, loss by Pyrates at Sea.  $\delta \text{ h } \delta$  R. 6 Febr.  $\delta \text{ h } \delta$  30 March in 3 deg. of  $\Omega$  and  $\text{m}$ .

*Of the ECLIPSES which will happen in 1727.*

There will be only two Eclipses this Year, and both of the *Sun*, one whereof will be Visible at *London*, if the Air be clear; they happen as followeth.

The first will be Invisible, on *Saturday March* the 11th, at 8 at Night; it happeneth in 1 deg. of  $\gamma$ .

The other falls on *Monday, September 4*, in the Forenoon, according to the following Calculation.

	d.	h.	m.	s.	
Hence the apparent time at <i>London</i> of the	Beginning <i>September</i>				3 18 51 41
	Middle				19 26 50
	Visible				19 30 56
	End of the Eclipse				20 4 26
	Total Duration				1 12 45
Digits Eclipsed				2 21 0	

P. M.

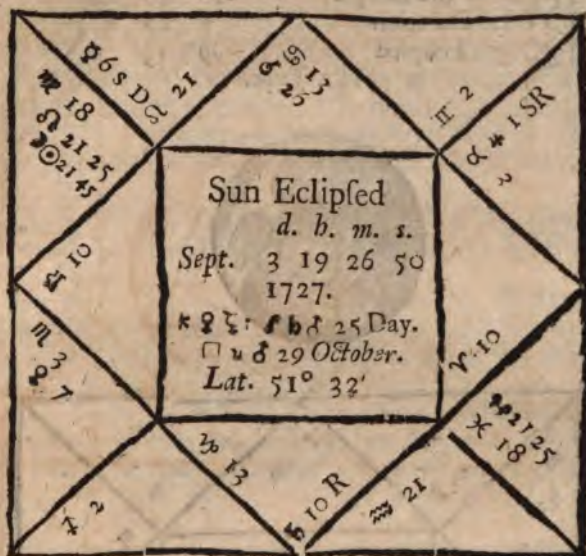
The Type.



This Eclipse happeneth in 21 deg. of  $\text{m}$ , and in the 12th House, and  $\text{v}$  is Lord thereof; this stirs up  
Se-



Seditions, and much Evil to Women, as also Damage to Fruit; ☿ exites Men to much Subtilty and Policy in all their Actions, tempestuous Winds, Ship-wracks, Pyrates at Sea, Thieves or Robbers at Land, Schisms and Heresies in Religion.



On the 12th Day of *January* there will be a ☿ ♄ in 6 deg. of ♄: And on the 20th of *May* a ♄ ♄ 2; and the 23d Day a ☿ ♄ 4 ♄ in 16 deg. of ♄, and ☐ ♄ 8; the Effects of these I shall leave to the Annual Scriblers.

*Of the ECLIPSES which will happen this Year, 1728.*

**F**OUR times this Year will the *Sun* and *Moon* be Eclipsed, twice the *Sun* and twice the *Moon*; they happen in the following Order.

The first is a partial Eclipse of the *Moon*, on *Wednesday* the 14th Day of *February* in the Morning, as followeth.

Hence the apparent  
time at London of the

	d.	h.	m.	s.	
Beginning Febr.	13	17	49	8	} P.M.
True Ecliptic 8		19	8	42	
Middle		19	13	54	
End of the Eclipse		20	48	40	
Total Duration		2	49	32	
Digits Eclipsed		9	13	6	

The Type.



The Middle and End of this Eclipse will not be seen at *London*, the Moon Sets about 8 Digits darkened; it falls in 6 deg.  $\text{m}$ , and in the 6th House;  $\text{F}$  being chief Ruler, denotes quick and crafty Actions on the Stage of the World; excites Men to much Subtily; the Death, or miserable State of some Prince, high Winds, great Robbing both by Sea and Land:  $\text{J}$  Retrograde in the 6th in  $\text{J}$  to  $\text{C}$  in the 12th, shews the common People to be much oppressed by Taxes,  $\text{E}$ tc. and great perplexity by the Treachery of their Servants, and the Death of their Hogs, Sheep,  $\text{E}$ tc.

The second will be an Invisible Eclipse of the *Sun*, on the 28th Day of *February*, at 8 at Night; it falls in 20 deg. of  $\text{X}$ .

The third Eclipse is of the *Moon*, on the 8th Day of *August* at 5 at Night, and therefore Invisible, by reason the Eclipse is over before the *Moon* Riseth; this happeneth in 26 deg. of  $\text{m}$ .

The fourth and last Eclipse this Year, will be an Invisible one of the *Sun*, on the 24th Day of *August* at 1 in the Morning; the *Sun* is then in 11 deg. of *Virgo*.

*Of the ECLIPSES that will be in 1729.*

**F**IVE times to the Inhabitants of this Partly Globe, will the two great Lights of Heaven be Eclipsed from our sight, three times the *Sun*, Invisible, and twice the *Moon*, Visible, and total, with Continuance; they happen in the following Order.

The first is of the *Sun*, and Invisible, on the 18th of *January* at 6 in the Morning; it falls in 9 deg. of  $\text{m}$ .

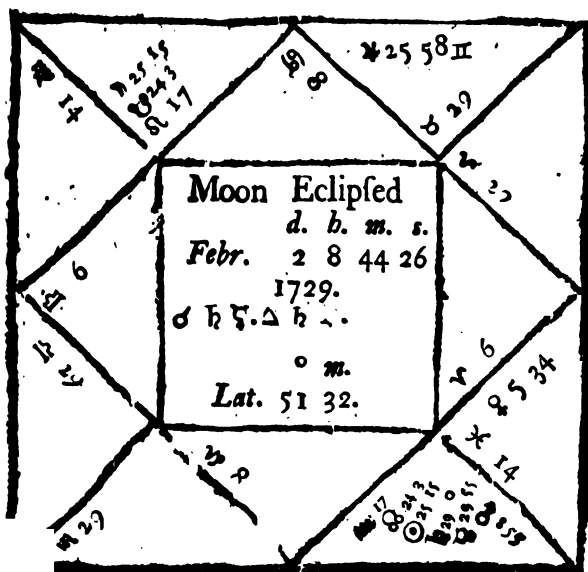
The second is a great and Visible Eclipse on *Candlemas Day* in the Evening as followeth.

Hence

# A Treatise of Eclipses.

	d.	h.	m.	s.	
Beginning	Febr. 2	6	57	52	
Beginning of total darkness		7	58	7	
Middle		8	44	26	
True Ecliptic &		8	45	25	
End of total darkness		9	30	45	P.M.
Full End of Eclipse		10	31	0	
Continuance total darkness		1	32	38	
Total duration		3	33	18	
Digits Eclipsed		19	17	0	

The Type.



This

This Eclipse falls in the 3d Decanate of  $\Omega$ , and in the 11th House; *Jupiter* is Lord of the Eclipse, he signifies plenty of all useful things, and Peace among the People; a wholsom Air and quiet Sea.

The third is of the *Sun* Invisible, on the 16th Day of *February*, at 9 at Night; it happeneth in 9 deg. of *Pisces*.

The fourth is of the *Sun* also, on St. *Swithin's* Day, at 1 in the Morning, and consequently Invisible; it falls in 21 deg. of  $\Omega$ .

The fifth and last is a great and Visible Eclipse of the *Moon*, on *Tuesday* the 29th Day of *July*, in the Morning, according to the following Calculation.

		d.	h.	m.	s.	
Hence the apparent time at London of the	{ Beginning <i>July</i>	28	11	33	5	P.M.
	{ Beginning of total darkness	12	33	51		
	{ Middle,	13	19	31		
	{ True Ecliptick $\delta$	13	20	47		
	{ End of the Eclipse	14	5	11		
	{ Full End of the Eclipse.	15	5	57		
	{ Continuance total darkness	1	21	20		
	{ Total duration	3	32	52		
	{ Digits Eclipsed	18 <sup>o</sup>	47	0		

The Type.







This Eclipse falls in 16 deg. 08'  $\approx$ , and near the Cusp of the 9th House; *Saturn* is Lord of this Eclipse: It denotes Sadness, Fears, obnoxious Diseases, destruction to Cattel, unwholsom Air. Cast your Eyes on the Scheme above, and you'll see the two Superiors  $\mu$  and  $\delta$  appling to a Conjunction, in the Tropical Sign *Cancer*, accompanied by the lustful *Venus*; these are the fore-runners of War, terrible Slaughters, Fire and Sword, Inundations, &c. and Cruelty used by the *Turks* against the *Christians*.

*Of the ECLIPSES which will happen in this  
Year, 1730.*

**F**OUR Eclipses this Year, 1730. viz. three of the *Sun*, and one of the *Moon*, they happen as follows.

The first is an Invisible Eclipse of the *Sun*, on the 7th Day of *January* between 6 and 7 o'Clock at Night; it falls in 28 yr.

The second is a partial Eclipse of the *Moon*, and Visible, (at *London* if the Air be clear) on *Friday* the 23d of *January* in the Morning, as followeth.

	d.	h.	m.	s.	
Beginning	Jan. 22	14	37	34	} P. M.
Middle		15	33	48	
True Ecliptick 8		15	42	2	
End of the Eclipse		16	30	2	
Total duration,		1	52	28	
Digits Eclipsed are		28	53	0	

Hence the apparent  
time at *London* of  
the

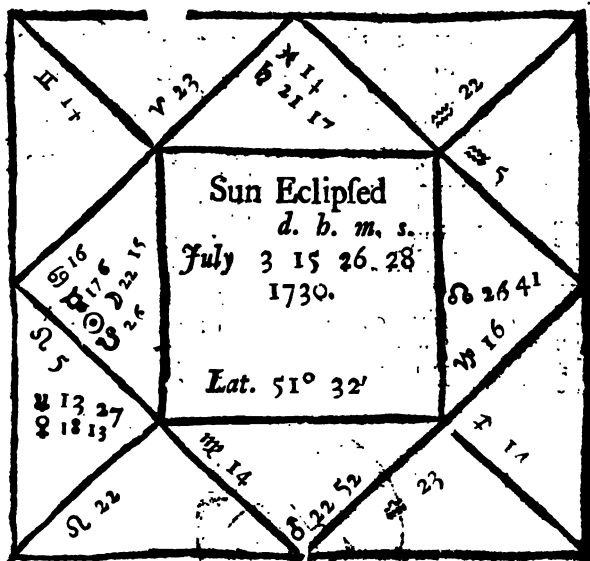
The Type.





*A Treatise of Eclipses.*  
The Sun Rifeth Eclipsed thus.

51



This Eclipse happeneth in the 22d deg. of  $\text{♋}$  and in the Ascendant; this afflicts great Ladies with Dropsical Humours, the Common People with sluggish Diseases, over swelling of the Sea by Fits. Tho' *Venus* being Lady of the Eclipse, and in the 2d House, gives Health and Happiness to the Common People in general, Joy, Success, Delight and Pleasure, increase of Worldly Fame or Felicity, temperate Winds, plenty

of seasonable Showers, which help to ripen the Fruits of the Earth.

The fourth and last Eclipse is of the *Sun*, and Invisible, on the 28th day of *December*, at 10 a Clock in the Forenoon; the Moon has then great Parallax in Latitude, is the reason it will not be seen at *London*.

*Of the ECLIPSES which will happen in the Year 1731.*

**F**OUR times to the Inhabitant of this Earthly Globe will the two great Lights of Heaven be deprived from their Sight; twice each Luminary.

The first is a partial and visible Eclipse of the *Moon*, on *Wednesday* the 9th Day of *June*, in the Morning, according to the following Calculation.

	<i>d.</i>	<i>b.</i>	<i>m.</i>	<i>s.</i>	
Hence the apparent time at <i>London</i> of the	8	13	12	24	} P. M.
Beginning <i>June</i>					
True Ecliptick	8	13	46	40	
Middle			13	54	
End of the Eclipse			14	37	
Total Duration			1	25	} 2
Digits Eclipsed			10	52	







This is a small Eclipse, therefore the Effects cannot be great; it falls in the last face of *Sagittarius*, and in the 8th House, just past the Opposition of *Mars* in the 2d House. This stirs up whimsical Actions among Men, and detriment to Horses and Mules.

The second will be a solar Defect, on the 23d Day of *June*, at five in the Morning. It will not be seen at *London*, but such as Sail in the *Mediterranean* will see the same Darkness on the lower side of the *Sun's* Body; it falls in 11 deg. of *Cancer*.

The third is of the *Moon*, and invisible, on the 2d Day of *December*, a quarter before 11 a Clock before Noon. This fall in 6 deg. of *Sagittarius*.

The fourth and last Eclipse is an Invisible one of the *Sun*, on the 18th Day of *December*, at 1 in the Morning. This happeneth in 6 deg. of *Capricorn*.

of



Of the ECLIPSES which will happen  
in 1732.

**F**IVE times this Year will the two great Lights of Heaven come within the Ecliptick Boundaries; three times the *Sun*, and twice the *Moon*; they happen as followeth.

The first will be of the *Moon*, and invisible, on the 28th Day of *May*, at 2 a Clock in the Afternoon; it falls in 17 deg. of *Sagittarius*.

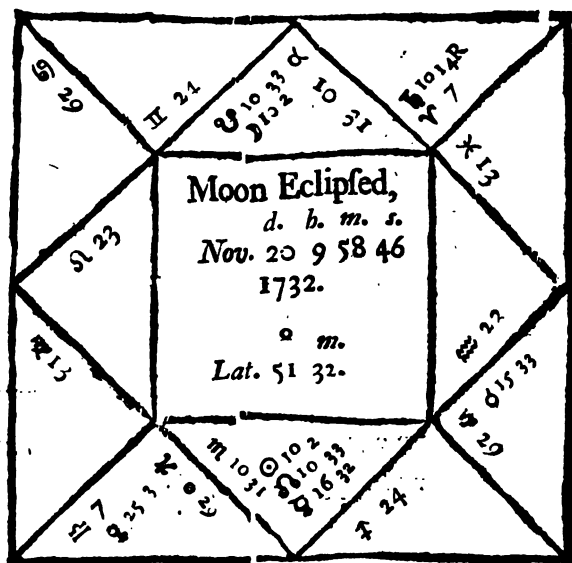
The second Eclipse is of the *Sun*, on the 11th day of *June*, at Noon; it will not be seen at *London*, by reason of the Moon's great South Latitude, it being augmented by her Parallax in Latitude.

The third Eclipse is of the *Sun*, and invisible, on the 6th day of *November*, at 4 in the Afternoon; it falls in 25 deg. m.

The fourth is a great and total Eclipse of the *Moon*, and visible, on *Monday* the 20th day of *November*, in the Afternoon, according to the following Calculation.

		d.	h.	m.	s.	
Hence the apparent time at <i>London</i> of the	{ Beginning <i>November</i>	20	8	13	6	P. M.
	{ Beginning of total darkness		9	11	25	
	{ True Ecliptick $\oslash$		9	58	21	
	{ Middle		9	58	46	
	{ End of total darkness		10	46	7	
	{ Full End of the Eclipse		11	44	26	
	{ Continuance total darkness		1	34	42	
	{ Total duration		3	31	20	
	{ Digits Eclipsed	20	6	48	0	

The Type.



This Defect falls in the 10th House, in Opposition to *Mercury*, who is Lord of the Eclipse; the Effects of this fall on great Men, excites them to much Subtlety and Policy in all their Undertakings; it denotes tempestuous Winds, Shipwrack, &c. Schisms, &c. in Religion.

The

The fifth and last Eclipse is of the *Sun*, on the 6th of *December*, at 9 in the Morning; it is so very small at *London*, that 'tis not worth your while to take Notice of it, for the lower part of the *Moon*, will but just touch the *Sun's* upper Limb; so I shall not trouble you with any further Account of it; only view the Type, which will be thus.



S

*Of the ECLIPSES of the Sun and Moon that will happen in 1733.*

**T**HERE will be four Eclipses this Year, two of the *Sun*, and as many of the *Moon*.

The first will be a great and visible Eclipse of the *Sun*, on *Wednesday* the 2d day of *May*, in the Afternoon.

Hence

	d.	h.	m.	s.
Hence the apparent time at London of the Beginning May	2	5	42	5
Visible ♂		6	35	39
Middle		6	36	33
End of the Eclipse		7	27	26
Total Duration		1	45	21
Digits Eclipsed	9	30	0	0

P.M.

The Type.



The Effects of this Eclipse fall on the Common  
sort of People, Oxen, &c. to Women with Child,  
and Travellers.



The second Eclipse is of the *Moon*, and, if the Air be clear, will be part visible, on *Thursday* the 17th day of *May*, in the Afternoon, according to the following Calculation.

		d.	h.	m.	s.		
Hence the apparent time at <i>London</i> of the	{ Beginning	May 17	5	25	29	} P. M.	
	{ Middle		6	56	26		
	{ True Ecliptick		7	2	20		
	{ End of the Eclipse		8	17	23		
	{ Total duration		3	1	54		
	{ Digits Eclipsed are		8 <sup>o</sup>	25	0		

The greatest part of the Darkness is over e'er the Moon Riseth, therefore I shall omit the Type and Face of Heaven at the middle thereof, and only give you her Appearance at her Rising, which will be thus.

The





The third Eclipse is of the *Sun*, and invisible, on the 26th day of *October*, near 5 in the Afternoon; it falls in 14 deg. of *Scorpio*.

The fourth and last is an invisible Eclipse of the *Moon*, on the 10th of *November*, at 1 in the Afternoon. This falls in 29 deg. of *Taurus*.

*Of the ECLIPSES which will happen in the Year 1734.*

**O**Nly two Eclipses this Year, and both Invisible; the first is on the 22d day of *April*, at 10 in Morning, in 12 deg. of *Taurus*.

And the other is on the 15th day of *October*, near 7 at Night. This is made in 3 deg. of *Scorpio*.

*Of the ECLIPSES of the Sun and Moon that will happen in 1733.*

**T**HERE will be four Eclipses this Year of the *Sun* and *Moon*, two of each Luminary: They happen in the following Order.

The first is of the *Moon*, and invisible, on the 27th day of *March*, near 11 a Clock in the Forenoon. It happeneth in 17 deg. of *Libra*.

The second will be of the *Sun*, and invisible also, on the 11th day of *April*, at 11 at Night. This falls in 2 deg. of *Taurus*.



This Eclipse falls in the 9th House in *Aries*; the Effects are likely to fall on Churchmen and Travelers beyond Sea; *Mars* is Lord of the Eclipse; and he stirs up bold, resolute, confident and violent Actions on the Stage of the World. This falls in *England's* Ascendant.

The fourth and last Eclipse this Year is of the *Sun*, and invisible, on the 5th day of *October*, at 2 a Clock in the Morning; it falls in 12 deg. of *Libra*.

*Of the ECLIPSES which will happen this Year, 1736.*

IN this Year, 1736. there will be six Eclipses, four of the *Sun* Invisible, and two great and total Eclipses of the *Moon* visible. They happen in the following Order.

The first will be a small Eclipse of the *Sun*, on the 1st Day of *March*, 36 min. past 2 in the Afternoon; It will only be seen in the Northern parts of the World.

The second is a great and total Eclipse of the *Moon*, and visible at *London* if the Air be clear, on *Monday* the 15th Day of *March*, at Night, according to the following Calculation.

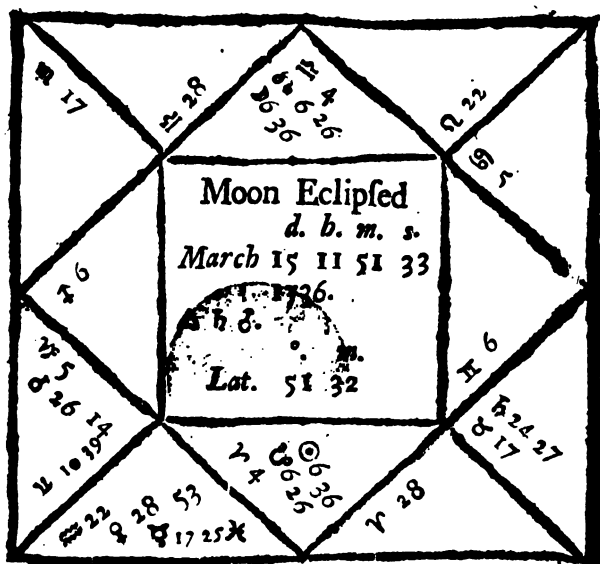
	<i>d.</i>	<i>h.</i>	<i>m.</i>	<i>s.</i>
Equal time of the true Opposition at <i>London</i> , <i>March</i>	15	11	49	26
Mean Anomaly <i>Sun</i>	8	26	56	19
Mean Anomaly <i>Moon</i>	7	2	25	11
Place of the <i>Sun</i> from the Earth	7	6	26	11
Place of the <i>Moon</i> in her Orbit	2	6	36	11
North Node subtract	2	6	26	26
Argument Latitude	0	0	9	45
True Latitude of North Ascending				51
Reduction subtract				2
Time of Reduction add				3
Correct time true Ecliptick	8	March 15	11	49 29
Equation				

	d.	h.	m.	s.
Equation of Time add			2	11
Apparent time true Ecliptick &	15	11	51	40
Hourly Motion <i>Sun</i>			2	28
Hourly Motion <i>Moon</i>			37	18
Hourly Motion $\gamma$ $\alpha$ $\odot$			34	50
Sum, Horizontal Parallax $\odot$ $\alpha$ $\Delta$			60	35
Semidiameter $\odot$ subtract			16	17
Rest Apparent Semidiameter Earth's shadow			44	18
Semidiameter $\Delta$ add			16	33
Sum			60	51
Latitude $\gamma$ subtract			0	51
Rest Scruples deficient			60	0
Scruples of Incidence			60	50
Time of Incidence, or half duration, } subtract and add	1	44	48	
Scruple of half continuance in total darkness		27	44	
Time of half continuance in total darkness		47	47	
Interval of & and greatest darkness subtract				7

	d.	h.	m.	s.
Hence the apparent time at London of the { Beginning <i>March</i> 15 10 6 45				
{ Beginning of total darkness 11 3 46				
{ Middle 11 51 33				
{ True Ecliptic & 11 51 40				
{ End of total darkness 12 39 20				P.M.
{ Full End of Eclipse 13 36 21				
{ Continuance total darkness 1 35 34				
{ Total duration 3 29 39				
{ Digits Eclipsed 21 45 0				

	m.	s.	
Lat. $\Delta$ at { Beginning 4 49			South Descending.
{ End 6 32			North Ascending.

# The Type.



This Eclipse falls in the 10th House; it denotes the Death of great and noble Men, a sickly Air, with Tempestuous Storms of Hail.

The third is an invisible Eclipse of the *Sun*, on the 31st of *March*, at 7 a Clock in the Morning. This will only be seen in the Southern parts of the World. It falls in 21 deg. of *Aries*.

The



The fourth Eclipse is of the *Sun* also, on the 25th of *August*, at 9 in the Morning. This falls in 13 deg. of *Virgo*, and is only visible in the Southern parts of the World.

The fifth is a great and visible Eclipse of the *Moon*, on *Thursday September* the 9th Day, in the Morning, according to the following Calculation.

	d.	h.	m.	s.
Hence the apparent time at London of the				
Beginning <i>September</i>	8	13	7	30
Beginning of total darkness	14	12	59	
Middle	15	2	24	
True Ecliptick	8	15	2	40
End of total darkness	15	51	49	
Full End of the Eclipse	16	57	18	
Continuance total darkness	1	38	50	
Total duration	3	49	48	
Digits Eclipsed	20	32	0	

P. M.

The Type.



This



This Eclipse falls in the 8th House, and in the 27th deg. of *Pſces*; And Authors ſay, that ſuch an Eclipse as this is ſignifies Seditions, Cruel and inhumane Actions of Soldiers, Sea-fights, and Death of Fiſh. But *Jupiter* is Lord of the Eclipse in the 6th Houſe, Retrograde, ſtirrs up many falſe and treacherous Actions amongſt Servants, cauſeth Diſtempers amongſt the ſmaller ſort of Cattel, as Hoggs, Sheep, &c. *Mars* in the 9th Retrograde, diſturbes the Seas with Pyrates, Shipwrack, and cauſeth bad Succeſs in Navigations. *Saturn* in the 10th, brings Sorrow on ſome Prince, if not a Summons to his long home.

The Places likely to be concern'd in the Effects of this Eclipse, are *Portugal*, *Cilicia*, *Egypt* the higher, *Phazonia*, *Nazomonitidis*, *Garamantis*, *Lydia*, *Pamphilia*, *Calabria*, *Lufitania*.

Cities or Towns, *Alexandria, Compostella, Sibilis,*  
or *Hyspalia, Parantium, Rotomagum, Normatia,*  
*Worms, Ratisporia.*

And the Places under the 8 Sign  $\text{♊}$  will be concer-  
ed in the Effects; also as *Babylon, Athens, &c. Jeru-*  
*salem, Paris, Reading in England, &c.*

*Of the ECLIPSES which will happen in the*  
*Year, 1737:*

**F**OUR times this Year, 1737. will the two great  
Lights of Heaven come within the Ecliptick Boun-  
daries, twice the *Sun* and as often the *Moon*, which  
fall in the following order.

The first will be a great and visible Eclipse of the  
greater *Luminary* the *Sun*, on *Friday* the 18th day of  
*February*, according to the following Calculation.  
In the Meridian of *London*, Anno *7* d. h. m. s.

1737. February				
Middle time true $\odot$	18	2	6	31
Mean Anomaly $\odot$	8	1	18	39
Mean Anomaly $\text{☾}$	10	29	13	53
Longitude of the $\odot$ and $\text{☾}$	X	10	58	26
North Node subtract	5	18	18	43
Argument Latitude	5	22	29	43
Moon's true Latitude North Descending			39	8
Reduction add			1	41
Ecliptick place <i>Moon</i>	11	11	0	7
Hourly Motion $\text{☾}$ a $\odot$			27	38
Time of Reduction subtract			3	39
True Ecliptic <i>1</i> February	18	2	2	52
Equation of Time subtract			5	54
Apparent time true Ecliptick $\odot$	18	1	56	58
<i>Sun's</i> true place	X	10	58	17
<i>Sun's</i> Right Ascension		342	27	0
Apparent time from Noon add		29	14	30
				Sum,

	d.	h.	m.	s.
Sum, Right Asc. M. Cœli	371	41	30	
Complement	11	41	30	
Medium Cœli in Ecliptick	γ	12	43	0
Declination Culminat. point		5	2	0
Meridian Angle		67	1	0
Altitude Equator at <i>London</i>		58	28	0
Altitude Midheaven		43	30	0
Altitude Nonageffima		48	6	0
Distance Midheaven a Nonageffima		22	22	0
Nonageffima degree	γ	5	5	0
Distance a Nonageffima	1	24	6	43
Horizontal Parallax ) a ⊙			52	53
Parallax Longitude ) a ⊙			31	56
Parallax Latitude ) a ⊙			35	18

At 1 hour after true of <i>February</i>	18	2	56	58
Sun's place is	♄	11	0	47
Sun's Right Ascension		342	30	0
Apparent time from Noon add		44	14	30
Sum, Right Ascension Medium Cœli		386	44	30
Complement		26	44	30
Medium Cœli in Ecliptick	γ	28	47	0
Declination Culmit. point		11	5	0
Meridian Angle		69	9	0
Altitude Equator at <i>London</i>		38	28	0
Altitude Midheaven		49	33	0
Altitude Nonageffima		52	41	0
Distance Midheaven a Nonageffima		16	53	0
Nonageffima Degree	♄	15	40	0
Distance a Nonageffima dr.	2	4	39	13
Horizontal Parallax ) a ⊙			52	52
Parallax Longitude ) a ⊙			38	0
Parallax of Latitude ) a ⊙			32	3
Hourly Motion ) a ●			27	36
Difference Parallax Longitude ) a ● subtract			6	4
Visible hourly Motion ) a ⊙.			21	32
	1 2			Interval

	<i>d.</i>	<i>h.</i>	<i>m.</i>	<i>s.</i>
Interval between true and visible $\delta$ add	1	28	59	
Visible $\delta$ is 1737. <i>February</i>	18	3	25	57
Sun's place	X	11	1	59
Sun's Right Ascension		342	30	0
Apparent time $a$ Noon add		51	29	15
Sum, Right Ascension M. C.		393	59	15
Complement		33	59	15
Medium Cæli in Ecliptic	8	6	19	0
Declination Culmit. Point N.		13	39	0
Meridian Angle		70	41	0
Altitude Equator at <i>London</i>		38	28	0
Altitude Midheaven		52	7	0
Altitude Nonagesima		54	38	0
Distance Midheaven $a$ Nonagesima ad.		14	28	0
Nonagesima Degree	8	20	45	0
Distance $\odot$ $a$ Nonagesima W.	2	9	43	1
Horizontal Parallax $\triangleright a \odot$			52	52
Parallax of Longitude $\triangleright a \odot$			40	25
Distance $\odot a \triangleright$			40	25
Parallax Latitude $\triangleright a \odot$			30	38
True Latitude Moon North Descending			35	19
Visible Latitude North Ascending			4	41
Semidiameter $\bullet$			16	23
Semidiameter $\triangleright$			14	56
Sum Semidiameters			31	19
Visible Latitude $\bullet$ subtract			4	41
Rest Scruples deficient			26	38
Digits Eclipsed are		90	45	0
Scruples of Incidence			30	58
Time of Incidence subtract		1	23	38
Time Repletion add		1	17	51
Interval between visible and greatest darkness, subtract		2	1	2

Hence



		d.	h.	m.	s.	
Hence the apparent time at London of the	Beginning	February 18	2	1	17	P. M.
	Middle or greatest darkness		3	24	55	
	Visible &		3	25	57	
	End of the Eclipse		4	42	46	
	Total Duration		2	41	29	
	Digits Eclipsed		9	45	0	

		m.	s.	
Lat. ) seen at	Beginning	3	13	N. Ascending.
	End	4	57	

The Type.





If you observe the Face of Heaven above, you will see the Luminaries on the Cusp of the 8th House, *Jupiter* and *Mercury* close in Council, in the Western-Angle, the two *Maleficks* in the 10th, *Saturn* in Square to Retrograde *Mercury*, Lord of the Second, *Leo* Ascending, and the Eclipsed *Sun* Lord thereof. Thus stands the Heavens posited at *London* at the middle time of this great Eclipse, of which *Jupiter* is principal Ruler, viz. of the House, Term, Decanate or Face; where he produces all things plentiful for the use of Mankind, but *Mercury* in Conjunction Retrograde, and under the *Sun's* Beams, denotes the Persons signified by *Jupiter* to be of high *Minds*, lofty Dispositions, aiming at things out of their reach; it signifies the Death of many of them, Earthquakes,

Earthquakes, and Mischief to Fish: But this is to be noted, it affects such as have *Jupiter* in their Ascendant, or *Medium Celi*; I say, 'tis those that will feel the Influence of this Eclipse: And as to the duration of its Effects, it will be two Years and nine Months, which takes date the very Day the Eclipse happens.

*Jupiter* and *Mercury* are Oriental of the Sun; *Saturn*, *Mars* and *Venus* Occidental, and after the Sun is set, *Venus* may be seen Westward, she is now distant from him 43 deg. *Saturn* and *Mars* may be seen at the same time more to the South. The Places subject to the Effects of this Eclipse, are *Portugal*, *Galitia*, *Cilicia*, *Egypt* the higher, *Nazomontidis*, *Garamatis*, *Lydia*, *Pamphilia*, *Ca'abria*, *Normandia*, *Lusitania*.

Cities and Towns, *Alexandria*, *Compostella*, *Sibilia*, or *Hyspali*, *Worms*, &c.

And the Harp and the Viol, the Tabret and Pipe, and Wine are in their Feast, but they regard not the Works of the Lord, neither consider the Operation of his Hands, *Isaiah* 5. 12.

The second Eclipse this Year is of the lesser Luminary, the *Moon*, and invisible; It happeneth on *Saturday* the 5th day of *March*, 35 min. past Noon, in 26 deg. of the *Celestial Virgin*; 'tis but a small Eclipse, where our *Antipodes* may behold about one third of the *Moon's* Diameter, dark on the South or lower Side.

The third will be a Solar *Deliquium*, on *Monday* the 15th day of *August*, at 1 a Clock in the Morning, but it cannot be seen of us, because the Meridian thereof is so far removed to the Eastward, and therefore it may be seen in *East-India*, in *Java* the great and less, and in the Oriental Kingdom of *Bangala*.

The fourth and last Eclipse this Year is of the *Moon*, and visible at *London* (if Clouds interpose not) on *Monday* the 29th day of *August* in the Morning, as followeth.

Hence

Hence the apparent time at <i>London</i> of the	{		<i>August 28</i>	<i>d. h. m. s.</i>				P. M.
				14	34	00		
				15	44	00		
				15	52	00		
				16	54	00		
				2	20	00		
				4 <sup>q</sup>	34	00		

Lat. D at	{		<i>m. s.</i>		{	South Ascending.
			38	50		
			45	2		

The greatest Darkneſs will be thus.

The Type.



The Heavens will be poſited at *London*, at the middle of the Eclipse, as the following Scheme ſheweth.

The





The Eclipsed *Moon* falls in 16 deg. of the Cœlestial Fish, within the Bounds of the 8th House, near the Body of Retrograde *Jupiter*, *Saturn* in the 10th, in square to *Mars* in the 2d, where *Mercury* is also seated; *Venus* is our bright Morning-star on the Cusp of the 12th, no less than 44 deg. 55 min. distant from the *Sun*; *Leo* Ascends, and *Sun* Lord thereof on the Cusp of the 2d. This is the Face of Heaven, at the middle time of this Lunar *Deliquium*.

An Eclipse of the *Moon* moves Subjects to Sedition, Servants to Disobedience, and Wives to a disorder against their Husbands, for which they are all made suffer for it. Here we have *Saturn*, *Jupiter* and *Mercury*, (*Saturn* is disposed by *Mercury*, who Rules the Term) concerned in the Government of this Eclipse, but *Jupiter* and *Mercury* most; which seems as if some Topping Gownsmen were like to meet with



a just Reward for his under-hand Dealing. For the Countries that are like to be passive under the Effects of this Eclipse, see the account of the *Sun's* Eclipse in *February* last, pag. 71. The Effects hereof are like to continue about 10 Weeks; which brings me to the end of this Year's Observations.

Of the ECLIPSES which will happen in the  
Year 1738.

**W**ITHIN this Year's Revolution there will be only two Solar Eclipses; but one visible in our Hemisphere.

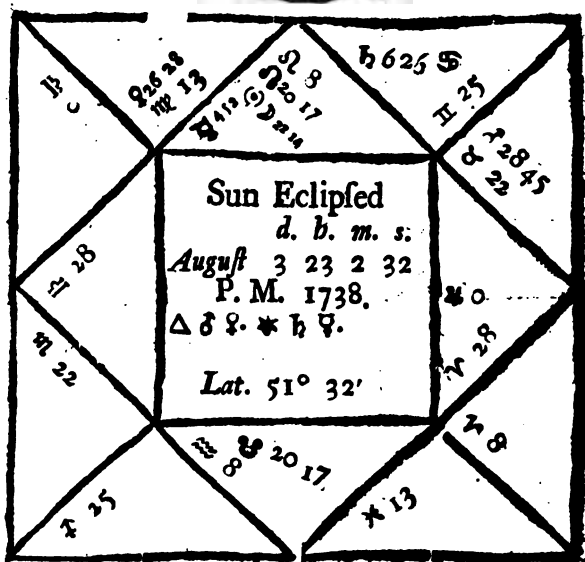
The first of these Solar Defects, happeneth on *Tuesday*, the 7th Day of *February*, at 6 a Clock at Night, the *Sun* sets at *London* ere the Eclipse begins, but in the more South-West parts of the World it may be seen. It falls in the very beginning of *Pisces*; but because it will not be visible to us, I forbear to mention it further.

The other Solar Eclipse will be on *Friday* the 4th Day of *August*, in the Forenoon, according to the following Calculation.

		d.	h. m. s.		
Hence the apparent time at <i>London</i> of the	{ Beginning	<i>August</i>	3	21 57 37	P. M.
	{ Visible			22 57 41	
	{ Middle or greatest darkness		23	2 32	
	{ End of the Eclipse		4	0 8 35	
	{ Total Duration			2 10 58	
	{ Digits Eclipsed		4	8 0	

Visible Lat. ) seen at	{ Beginning	m. s.	S. A.
	{ End	20 57 21 20	

The Type.



At the time of this Eclipse, the two Superiors *Saturn* and *Jupiter* have lately passed their *Perichelions* (or, if you please, their *Perigaeons*) and *Saturn* is just on the Station of his Retrogradation, in the 9th house, in Sextil to *Venus* in the tenth; *Libra* on the *Eastern finitor* and *Venus* Lady thereof, in the 11th, in Δ to *Mars* in the 8th. *Sol* and *Jupiter* archief Rulers in this Eclipse; *Mars* may be said to have some small Dominion

Dominion by Ruling the Decanate, but his evil Design is mitigated, by being in  $\Delta$  to *Venus* in the 11th. Thus stand the Condition of the Heavens at the middle time of the Eclipse, which falls in the Angle of Honour, and *Cardan* tells us, that *Sun* Eclipsed in the 10th house, does generally stir up Sedition, Tumults, Rebellions, &c. against Governours and Government, such as Wars, Slaughters, Commotions, Captivities, and such like Evils: The Places under the Eclipsed Sign, &c. are *Ita'y*, *Sicilia*, *Bobemia*, *Phenicia*, the *Alps*, *Amilia*, *Chaldea*, *Sabina*, *Togata*, *Orichemia*, and part of the *Ottoman Empire*.

Cities and Towns, *Bristol* in England, *Prague*, *Lazius*, *Damascus*, *Rome*, *Ravenna*, *Cremona*, *Ghent* in *Flanders*. The Effects of which will be felt to continue two Years and two Months.

Also those Persons who have 22 deg. or thereabouts, of *Leo* or *Aquaries* on their Ascendants, or *Medum* *Casi Sun* or *Moon*, will in some Measure feel the Effects thereof.

Of the ECLIPSES of the Sun and Moon that will happen in 1739.

FIVE times will the Luminaries be Eclipsed to us that inhabit this Globe of Earth, three times the *Sun*, and twice the *Moon*, which fall in the following order.

The first is a partial, and visible Eclipse of the *Moon*, on *Saturday* the 13th day of *January* at night, according to the following Calculation.

Hence

Hence the apparent  
time at *London* of  
the

{	Beginning	<i>January</i> 13	d.	9	m.	32	s.	56	} P. M.
	Middle or great darkness		10	47	21				
	True Ecliptick	8	10	54	7				
	End of the Eclipse		12	15	18				
	Total duration		2	42	22				
Digits Eclipse are			6 <sup>9</sup>	32	00				

Lat. > at	{	Beginning	m.	40	s.	21	} South Descending.
		End	33	13			

The Type.





In this Scheme there is no less than 3 of the seven Planets Retrograde; and the Eclipse it self falls in the *Medium Cali*, and being in the first Face or Decanate of *Leo*, it denotes the Death of a mighty Prince, violent Mischief, Cruelty and Toil, a scarcity of Corn and Fruits.

At the time of this Eclipse cast your Eye South South West, and there you will see *Saturn* above the great *Dog*, and look a little more to the West, you will see fiery *Mars* a little to the left of the seven Stars, near *Aldebrand*; and you may see *Jupiter* also at the same time near setting in the West. The other three, viz. *Sol*, *Venus* and *Mercury*, are all in the *Imum Cali*, and therefore not to be seen of us at *London*.

The second Eclipse this year is of the *Sun* Invisible on *Sunday* the 28th day of *January*, at 4 a Clock in the Morning in 19 deg. of *Aquaries*, it will be but a small



small Eclipse where most visible, the *Moon* having great South Latitude at that time.

The Third Eclipse is of the *Moon*, and Invisible also, it happeneth on *Monday* the 9th day of *July*, 18 min. past 4 in the Afternoon, it falls in 27 deg. of the Celestial *Goat*.

The Fourth is of the *Sun* and visible, on *Tuesday* the 24th day of *July* in the Afternoon, according to the following Calculation.

		d.	b.	m.	s.	
Hence the apparent time at London of the	{ Beginning 1739. July 24	3	10	56	P. M.	
	{ Visible	4	20	34		
	{ Middle, or great darkness	4	22	56		
	{ End of Eclipse	5	29	20		
	{ Total duration	2	18	24		
	{ Digits Eclipsed are	7°	6	00		
		m. s.				
Lat. D seen at	{ Beginning	13	11	North Descending.		
	{ End	11	10			

The Type thereof will be thus.





In this Eclipse all the Planets are direct in Motion, and the Eclipse falls in the 8th house, *Mars* in the 9th, *Saturn* and *Venus* conjoyn'd in the 7th, *Jupiter* in the 6th, Lord of the Ascendant; And thus are the Heavens posited at the middle time of this Eclipse, which, all considered together, brings Troubles to Princes and Magistrates, Wars, and Contentions about Religion; and *Saturn* in the 7th, creates many tedious Law-suits, and being in ♄ with *Venus* there, it denotes some young Lady to be deluded to the cold Embraces of some old Leacher; and *Mars* in the 9th, pesters the Seas with Pirates and Robbers. The Eclipse in it self will be very considerable, and well worth the observation of the Ingenious.

The

# A Treatise of Eclipses.

81

The Fifth and last Eclipse this year, will be a small one of the *Sun*, visible on *Wednesday* the 19th day of *December* in the Morning.

Hence the apparent time at London of the	d. h. m.		
	{ Beginning 1739. Dec. 18	20	18
	{ Visible	20	48 43
	{ Middle, or great darkness	20	48 58 P. M.
	{ End of Eclipse	21	30 3
	{ Total duration	1	19 45
	{ Digits Eclipsed are	2	10 00
m. s.			
Lat. D. seen at	{ Beginning	30	54
	{ End	23	46
North Descending.			

Note, The Declination of the *Sun* answering his Place at the time of the visible Conjunction is 23 deg. 14 min. South, and consequently the difference of Ascension is 32 deg. 42 min. (in the Latitude *London*) which in time is 2 h. 10 min. 48 sec. this added to 6 hours, the Sum is 8 h. 10 min. 48 sec. the time of *Sun* Rising that Morning at *London*; and the Eclipse begins the 19th in the Morning at 10 min. 18 sec. past 8, so that the Eclipse begins 30 sec. before the *Sun* Riset; the Type thereof is thus.

The Type.





The two Superiors *Saturn* and *Jupiter* are both Retrograde, and both in Angles, *Saturn* is chief Lord of the Eclipse, in his Detriment, we are like to expect hopeful things from him, for at the best he's but a Deceiver; the Eclipsed *Sun* is in a Cardinal Sign in the 12th house, and in the *Earthy Trigon*, it denotes Ruin and Destruction to Houses and the Fruits of the Earth; also the Death of many young Men, (because the Eclipse begins in the Ascendant) but here *Saturn* is chief Governour, and he signifies the Aged sort, so that they must expect to feel the Influence thereof in some measure as well as the other. *Mars* in the 12th with the afflicted Luminaries, brings a Murraine or raging Distemper on all sorts of great Cattle. Now as touching the Places where the Effects of this Eclipse shall be manifest, they are all removed far from *England*, therefore not worth our present notice, only *Worchester*, in *England*, will feel the Influence thereof in some measure or other.

*Of the ECLIPSES which will happen in the  
Year 1740.*

SIX times to the Inhabitants of this Terraqueous Globe, will the two great Lights of Heaven; come within the Ecliptic Boundaries, three times the greater Luminary the *Sun*, and as often the *Moon*; only two visible at *London*: They happen in the following order.

The first is a great and visible Eclipse of the *Moon*, (total with Continuance) on *Wednesday* the 2d day of *January* at Night, according to the following Calculation.

		<i>d. h. m. s.</i>			
Hence the apparent time at <i>London</i> of the	{ Beginning 1740. <i>January</i>	2	8	30	52
	{ Beginning total darkness.		9	36	30
	{ Middle or great darkness		10	25	16
	{ True Ecliptic		10	25	39
	{ End of the total darkness		11	14	22
	{ Full end of Eclipse		12	20	00
	{ Continuance total darkness		1	37	52
	{ Continuance Eclipse		3	49	8
	{ Digits Eclipsed are		20	29	00

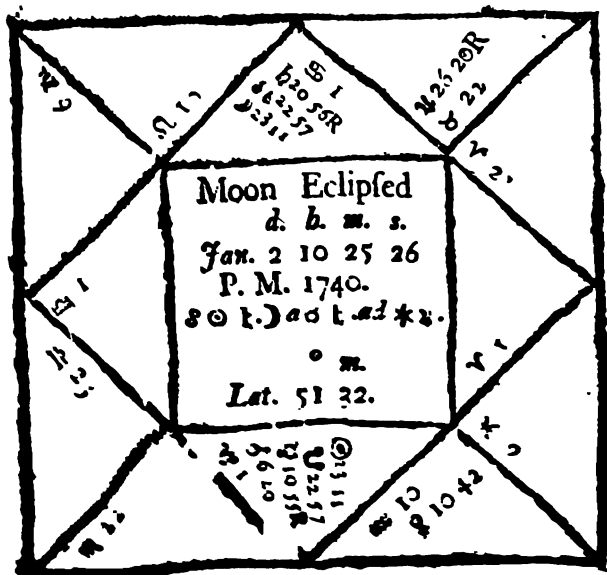
P. M.

		<i>m. s.</i>		
Lat. ) at {	Beginning	3	44	South Descending.
	End	6	10	North Ascending.



*A Treatise of Eclipses.*

### A Type of this Eclipse.



At the time of this Eclipse, there is three Planets Retrograde, and the Moon begins first to touch the Earth's shadow, near the Cusp of the 11th, and ends near the Cusp of the ninth; the greatest Darkness falls in 23 deg. of Cancer, a Tropical Sign, and of the Waterary Triplexity; *Juno* governs the Term, *Lucifer* self is Lady of the Sign, and third Part; it falls in

the house of Honour, near the Body of *Saturn*. This brings much Evil to great Ladies, and Women of mature Years, the Commonalty afflicted with Dropical and other sluggish Diseases, over-swelling of the Sea, and Rivers by fits.

The Places under the Eclipsed Sign ♄, and the opposite thereto ♊, will in a great measure feel the Effects thereof; the Places subject to *Cancer*, are, *Scotland*, *Holland*, *Zealand*, *Granado*, and *Numidia*, *Africa*, *Carthage*, *Calchis*, the lower *Burgundy*.

Cities, *York*, *St. Andrews*, *Amsterdam*, *Venice*, *Lubeck*, *Genoa*, *Tunis*, *Constantinople*.

At the greatest obscuration of this Eclipse, you may see *Saturn* a little to the Right of the *Moon*, near the Meridian, and more to the Westward *Jupiter* shineth very gloriously; all the rest of the Planets are under the Earth.

The Second Eclipse this year will be on *Thursday* the 17th day of *January*, at 8 a Clock at Night, it is of the *Sun*, and Invisible; it falls in 8 deg. 20 min. of *Aquaries*; it will be but a small Eclipse, the *Moon* having great South Latitude at that time.

The Third Eclipse is of the *Sun*, and Invisible also; it happeneth on *Fri'ay* the 13th day of *June*, at 2 a Clock in the Morning; this will be but small where conspicuous; it falls in 2 deg. 39 min. of *Cancer*.

The Fourth Eclipse this year falls in 17 deg. 16 min. of ♊, of the *Moon*, Invisible, on *Saturday* the 28th day of *June*, 23 min. past 9 in the Morning; near two thirds of the *Moon's* Diameter will be obscured on the North-side.

The Fifth Eclipse is of the *Sun*, and Invisible also, on *Sunday*, *December 7.* near 11 a Clock at Night; it falls in 27 deg. of *Sagittarius*; it will be visible to our *Antipodes*, and well worth their observing.

The Sixth and last is an Eclipse of the *Moon*, and visible at *London*, (if Clouds interpose not) on *Sunday* the

the 21<sup>st</sup> day of *December*, according to the following Calculation.

		d.	h.	m.	s.	
Hence the apparent time at London of the	{ Beginning	December 21	10	32	45	} P. M.
	{ Middle or great darkness		11	48	49	
	{ True Ecliptick	8	11	55	42	
	{ End of the Eclipse		13	4	43	
	{ Total duration		2	32	8	
	{ Digits Eclipse are		5	49	00	

		m.	s.	
Lat. D at	{ Beginning	36	00	} North Ascending.
	{ End	43	1	

The Type.

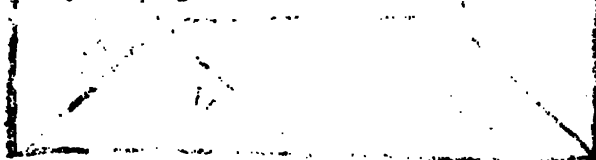




All the Superior Planets are Retrograde, *Jupiter* in the 9th house, *Mars* and *Saturn* in the 10th to the left of the *Moon*; all three to be seen very Glorious at the time of the Eclipse, not far distant from her. This Eclipse falls in the Tropical Sign *Cancer*, in the *Medium Cali*, where the *Moon* will lose near half her Light on the lower side her Body, as the Type above plainly proveth; *Cancer* is a moveable Sign, and of the Watery Triplicity; *Jupiter* may be took for chief Ruler in this Eclipse, he having two Places of Dignity in the Sign, but he's in a very poor Circumstance, so not able to perform any good to those signified by him: When *Jupiter* is st ong, and beareth principal Rule in an Eclipse, he gives good things, and is the general signifier of Peace and Tranquillity; but here it is not so, for those signified by him may expect just the contrary. This Eclipse falls in the second Decanate or Face of *Cancer*, and in the 10th house

house of Heaven; which signifies the Sea will be infected with *Pickaroons*, Merchants will sustain much Loss and Damage in their Adventures, many Infirmities afflict the People; the People that Inhabit the Places under the Signs *Cancer* and *Capricorn*, will only feel the Effects thereof; which Places you will find mentioned in the foregoing Pages, so I shall forbear to mention them here.

To conclude this Work of Eclipses, I shall here present the Curious with a Speculum drawn to the Scheme above, where, as in a Glass, you may see at one View how all the Aspects are formed all through the 12 Coelestial Houses, by which it will be easie for an Artift to do the like for all the other Eclipses, or for any other Figure whatsoever.





A SPECULUM for Decemb. 21, 1740. 89

Long.	♈	♉	♊	♋	♌	♍	♎	♏	♐	♑	♒	♓	Lat.
0													
1													
2													
3													
4	4	Δ		♂		Δ	□	*		♀	*	□	0 S 1
5					♊					♋			
6	49	□	*	♌		*	□	Δ		♍		Δ	0 S 3
7	56	Δ	□	*		♎	*	□	Δ		♏		0 N 35
8	Θ 7						Afc						190: 0
9				MC					IC				100: 0
0			Δ			Δ	□	*			*		
1	46	□	*	♐		*		Δ	☉		Δ		282: 48
2													
3													
4													
5						D12					D 6	47 28	
6													
7						D11					D 5	32 11	
8													
9													
0													
1													
2													
3	54	Δ		♈		Δ	□	*		♉	*	□	3 N 4
4													
5	54	□	*	♊		*	□	Δ		♋		Δ	4 N 4
6	19		Pli										4 N 0
7													
8		D 8											47 28
9		D 9											32 11

Note, The first Column on the Left-hand, contains the Longitudes of the Planets, with the Degrees and Minutes of the Cusps of the Houses; the last, or Right-hand column, contains the Latitudes of the Planets; only against the Sun, is his Right Ascension: the Degrees and Minutes against the Cusps of the Houses, are the Election of the Pole above each Circle of Position for the Latitude of London; against the Medium Caeli is its Right Ascension; and against the Ascendant, is its Oblique Ascension.

Of the ECLIPSES of the Sun and Moon that  
will happen 1741.

IN this Year there will be only two Eclipses, and both of the Sun, invisible at *London*. The first will be on *Tuesday, June 2.* at 10 in the Forenoon; the Apparent Time of the true Ecliptic Conjunction is at 19<sup>h</sup> 8<sup>m</sup> past 10, and the visible Conjunction is at 46<sup>m</sup> 29<sup>s</sup> past 9 the same Morning; but if then the Sun shine ever so bright, none of its Brightness will be obscured from the Inhabitants, in the Parallel of *London*, as thus I prove.

	S.	0	1	"
Argument of Lat. at the Visible $\odot$	11	26	23	15
True Lat. $\searrow$ South Descending			18	53
Parallax Latitude $\searrow$ à $\odot$ add			30	25
Sum, is the Visible Latitude $\searrow$ South			49	18
Semidiameter $\left\{ \begin{array}{l} \odot \\ \searrow \end{array} \right.$			16	2
			16	0
Sum of their Semidiameters			32	2

Here, at this Time and Place, the visible Latitude of the  $\searrow$  South, exceeds the Sum of the Semidiameters of the Sun and Moon, proves the Invisibility of this Eclipse at *London*; but in the more Southern Parts of the Earth it will be seen, as I thus prove.

	1	"
Horizontal Parallax $\searrow$	57	33
Of the $\odot$ Sub.		30
Remains the Semidiameter $\ominus$ Disk	57	3
Semidiameter of the Penumbra, add	32	2
Sum	1 <sup>o</sup> 29	5
Moon's true Latitude at true $\odot$ S D.	17	13

Hence, because the Semidiameters of the  $\ominus$  Disk and Penumbra exceeds the Moon's true Latitude at the time of the true Conjunction, proves the Sun will  
be

be Eclipsed somewhere on the Earth: and, because the true Latitude of the  $\mathcal{D}$  is less than the Semidiameter of the Earth's Disk, shews the  $\odot$  will be centrally Eclipsed somewhere on the Earth at that time. Lastly, because the Difference between the Earth's Disk and Penumbra, is more than the  $\mathcal{D}$ 's true Latitude, demonstrates, that all the Penumbra will fall within the Earth's Disk.

The second and last Eclipse this Year, 1741, is of the Sun, and Invisible at *London* also; it happens on *Friday, November 27th*, in the Morning, as followeth.

	<i>D.</i>	<i>b.</i>	<i>'</i>	<i>"</i>
Equal Time of the true $\odot$ 1741. Nov. 26	17	43	15	
Equation of Time, add		8	40	
Apparent Time at <i>London</i>	26	17	51	55
Mean Anomaly of $\odot$	5	8	52	0
$\mathcal{D}$	1	26	56	48
True Place of $\odot$ & $\mathcal{D}$	7	16	16	57
$\mathcal{D}$ Latitude $\mathcal{D}$ S. A.				33
Place of the $\mathcal{D}$ 's North Node	11	16	10	39
Argument of Latitude	6	0	6	18
Horizontal Parallax of $\odot$				30
$\mathcal{D}$			54	25
Semidiameter of Earth's Disk			53	55
Semidiameter of $\odot$			16	29
$\mathcal{D}$			15	12
Semidiameter of the Penumbra			31	41
Semidiameter of the Disk, add			53	55
Sum		1 <sup>o</sup>	25	36

This Sum far exceeds the  $\mathcal{D}$ 's Latitude, at the true time of the  $\odot$ , proves the Sun's will be Eclipsed at that time. And, because the Difference between the Earth's Disk and Penumbra, exceeds the  $\mathcal{D}$ 's true Latitude, proves the Eclipse will both be Central; and also, that all the Penumbra will fall within the Disk.



	D.	b.	′.	″.
Sun's Declination South			22	48
Sun's Ascensional Difference			31	57
The same in Time is			2	7
		Add	6	0
Sun rises at <i>London</i> at	8		7	48

This proves the Eclipse is under the Horizon of *London*, so cannot be seen there, but only in the South-East Parts of the World; for which reason I shall forbear giving any further account of it, at this time.

*Of the ECLIPSES that will happen in the  
Year 1742.*

Within the Circumference of this Year there will be four Eclipses of the Luminaries, two of each Light, but all invisible at *London*. They happen in the following order.

The first Eclipse is of the Moon, on *Sunday* the 8th Day of *May*, in the Afternoon, as follows.

	D.	b.	′.	″.
Equal Time of the true ☉ 1742, May 8	2	35	38	
Time of Reduction sub.			4	31
Ecliptic ☉	8	2	31	7
Equation of Time add			3	55
Apparent Time Ecliptic ☉	8	2	35	2
Mean Anomaly of ☉	10	18	53	56
		0	18	17
Place of the Sun from the Earth	8	28	18	53
Place of the Moon in her Orb	11	28	18	53
North Node subtract	2	7	35	39
Argument of Latitude	5	20	43	14
Reduction add			2	4
Hourly Motion of ☉			2	24
			29	50
Hourly Motion of ☾ ☉			27	26
				Sum

	<i>D.</i>	<i>b.</i>	<i>′.</i>	<i>″.</i>
Sum of the Horizontal Parallaxes			53	39
Semidiameter of the ☉ subtract			16	3
Apparent Semidiameter of the ☉ Shadow			37	36
Semidiameter ☽ add			14	53
Sum			52	29
Latitude of ☽ sub. N. D.			48	19
Scruples deficient			4	10
Digits eclipsed are	1°		40	46
Scruples of Incidence			20	29
Motion from true ☽ to the middle			4	6
Time of Incidence, or half Duration			44	48
Time from true ☽ to the middle add			8	58
Motion of ☉ in the time of Incidence			1	48
Argument Lat. at beginning	5	20	20	57
Argument Lat. at the End.	5	21	5	31

Lat. ☽ at { Beginning 50 13 } North Descending.  
                   { End 46 24 }

	<i>D.</i>	<i>b.</i>	<i>′.</i>	<i>″.</i>
Hence the ap- parent Time at London of the { Beginn. 1742, May 8	1	56	12	
{ Ecliptic ☽	2	32	2	
{ Middle	2	41	0	P. M.
{ End of the Eclipse	3	25	48	
{ Total Duration.	1	29	36	

The Type.



This Eclipse will not be seen at *London*, because it is over long before the Moon rises; but it will be visible to all the East and South Parts of *Tartary*, to the *Mogul's Empire*, *China*, and all the *East-India Islands*,



Islands, *Madagascar*, and to all the South Sea. The Moon is vertical a little to the East of *Hollandia-Nova*, the Land of *Van Diemens*, and at the Southern Pole; but to the South-East part of *Persia* the Moon will rise Eclipsed in the Eastern Horizon.

The Second Eclipse is of the Sun, but Invisible at *London*, by reason it falls so near Midnight; but it is a great Eclipse of itself, as I thus prove.

	D.	h.	l.	".
Equal Time of the true $\odot$ 1742, May 22	12	41	45	
Equation of Time add		2	29	
Apparent Time at <i>London</i>	22	12	44	14
Mean Anomaly of $\odot$	11	3	6	42
$\oslash$	6	26	42	40
Place of $\odot$ & $\oslash$ and $\oslash$ in her Orb	2	12	7	45
North Node sub.	2	6	49	20
Argument Latitude	0	5	18	25
True Latitude $\oslash$ North Ascend.		27	43	
Horizontal Parallax of $\odot$			30	
$\oslash$		60	19	
Semidiameter of the Earth's Disk		59	49	
Semidiameter of $\odot$		16	2	
$\oslash$		16	35	
Semidiameter of the Penumbra		32	37	
Semidiameter of the Disk add		59	49	
Sum	1	32	26	
Difference		27	12	

Here, because the Sum of the Semidiameters of the Earth's Disk and Penumbra exceeds the  $\oslash$ 's true Latitude at the time of the true  $\odot$ , proves the Sun will be eclipsed. Secondly, because the  $\oslash$ 's Latitude is less than the Semidiameter of the Earth's Disk, proves the Sun will be centrally eclipsed somewhere on the Earth. And, lastly, because the difference between the Penumbra and Disk is less than the  $\oslash$ 's true Latitude, shews that the Penumbra will not all fall within the  $\odot$  Disk.

The

The third Eclipse this year is of the lesser Light, the Moon, on *Monday, November 1*, near Noon, invisible, and small, as follows.

	D.	h.	′	″
Equal time of the true ☿ 1742, Nov. 1	0	29	14	
Time of the Reduction sub.		3	5	
Equal Time of the true Ecciptic ☿	1	0	26	9
Equation of Time add		15	44	
Apparent Time at <i>London</i> .	1	0	41	53
Mean Anomaly of ☿	4	13	15	46
	5	19	38	55
Place of the ☿ a ☉	11	19	57	54
Place of the ♀ in her Orbit	1	19	57	54
North Node sub.	1	28	12	56
Argument of Latitude	11	21	44	58
Reduction add		1	50	
Hourly Motion of ☿		2	31	
		38	6	
Hourly Motion of ♀ a ☉		35	55	
Sum of the horizontal Parallax		61	15	
Semidiameter ☉ sub.		16	26	
Rest apparent Semidiameter ☉ Shadow		44	49	
Semidiameter ♀ add		16	38	
Sum		61	27	
Latitude ♀ South Descending		43	00	
Scruples deficient		18	27	
Digits Eclipsed are	6°	39	16	
Scruples of Incidence		43	54	
Motion from the true ☿ to the Middle		3	40	
Time of Incidence, or half Duration	1	14	2	
Time from the true ☿ to the Middle add		6	11	
Motion of ☉ in the time of Incidence		3	6	

Argument Lat. at { Beginning	11	20	57	58
{ End	11	22	33	58

Lat. ♀ at { Beginning	43	53	S.D.
{ End	38	37	

Hence

		D. h. '. "			
Hence the ap- parent Time at London of the	Beginning 1742, Nov. 1	11	34	2	mane
	Ecliptic ☉	1	0	41	53
	Middle		0	48	4
	End of the Eclipse		2	2	6
	Total Duration		2	28	4

} P.M.



The Place to which the Moon is vertical, at the middle of this Eclipse, is a little to the East of *Los Hermanos* Isles, Longitude  $164^{\circ}$  East from *London*, and Latitude  $18^{\circ}$  North. The Places on the Globe where it will only be seen, are, the North part of *Lapland*, the Eastern and greatest part of *Muscovia*, all *Tartary*, in the Eastern parts of the *Caspian* Sea and *Persia*, in the *Mogul's* Empire, *China*, *Borneo*, *Java*, and in all the *East-India* Islands, in *California*, and in all the North parts of *America*, in *Hollandia Nova*, *Van Diemens*, *Zelandia Nova*, and in the great Ocean, *Mal del Zur*, in *Greenland* Whale Sound, and under the North Pole, &c. The Moon, at the middle, will be more than half darkned on the North side, as the Type above doth shew.

The fourth and last Eclipse this Year is a Solar Deliquium, on *Tuesday*, *November* 16, in the Morning, Invisible at *London*, as follows.

	D. h. '. "			
Equal Time of the true ☉ 1742 Nov. 15	18	10	18	
Equation of Time add		12	9	
Apparent Time at London	15	18	22	27
				Mean

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	<i>D.</i>	<i>h.</i>	<i>′.</i>	<i>″.</i>
Mean Anomaly of $\left\{ \begin{array}{l} \odot \\ \text{D} \end{array} \right.$	4	27	43	16
Place of $\odot$ à $\ominus$ and $\text{D}$ in her Orbit	0	2	11	32
North Node Sub.	8	4	52	33
Argument of Latitude	1	27	26	36
True Latitude $\text{D}$ South ascending	6	7	25	57
			38	46
Horizontal Parallax of $\left\{ \begin{array}{l} \odot \\ \text{D} \end{array} \right.$				30
			53	0
Semidiameter of the Earth's Disk			52	30
Semidiameter of $\left\{ \begin{array}{l} \odot \\ \text{D} \end{array} \right.$			16	29
			14	50
Semidiameter of the Penumbra			31	19
Semidiameter of the Disk add			52	30
Sum	1	23	49	
Difference			21	11

Here, because the Semidiameter of the Disk and Penumbra exceeds the  $\text{D}$ 's true Latitude at the true Time of the  $\sigma$ , proves the Sun will be eclipsed, or rather that some Part of the Earth will be deprived of the Sun's Light: And also because the  $\text{D}$ 's Latitude is less than the Semidiameter of the Earth's Disk, proves the Sun will be centrally eclipsed, but the Penumbra will not all fall within the Disk.

On *Monday* the 23d Day of *August* this Year at 2c' past 10 at Night happens a famous Conjunction of the two Superiors  $\text{h}$  and  $\text{u}$  in the regal Sign  $\text{Q}$   $27^{\circ} 55' 23''$ , *Saturn's* Lat.  $1^{\circ} 17' \text{ N}$  A: *Jupiter's* Lat.  $0^{\circ} 52' \text{ N}$ : A.  $\text{h}$  will be elevated above  $\text{u}$   $25' 28''$ . They are Morning Stars, and under the Sun's Beams.

*Of the ECLIPSES of the Sun and Moon that will happen in the Year 1743.*

**S**IX Times this Year to the Inhabitants of this terrestrial Globe will the two great Lights of Heaven come within the Ecliptick Boundaries, three Times







*A Treatise of Eclipses.*

	D.	h.	1.	2.
True Ecliptic ☿ at <i>London</i>	27	3	21	54
Equation of Time add			3	44
Apparent Time at <i>London</i>	27	3	25	38
Mean Anomaly of ☾	10	7	49	59
	10	23	44	16
Place of the ☾ at ☉	1	17	31	34
Place of the ☾ in her Orbit	7	17	31	34
North Node Sub.	1	18	49	33
Argument Latitude	5	28	42	1
True Lat. ☾ North descending			6	48
Reduction add			0	18
Hourly Motion of ☾			2	25
			30	19
Hourly Motion ☾ at ☉			27	54
Sum of the horizontal Parallaxes.			54	3
Semidiameter ☉ Sub.			16	6
Apparent Semidiameter ☉ Shadow,			37	57
Semidiameter ☾ add			14	59
Sum			52	56
Lat. ☾ Sub.			6	48
Parts deficient			46	8
Digits Eclipses are	180	28	30	
Scruples of Incidence		52	30	
Scruples of half Darknets		21	56	
Motion from the true ☉ to the middle				34
Time of Incidence Sub. and add	18	52	54	
Time of half Darkness Sub. and add		47	10	
Time from ☉ to the Middle add		1	13	
Motion of ☉ in the Time of Incidence		4	33	
Argument Latitude at ☉ Beginning	5	27	44	58
	5	29	39	4
True Lat. ☾ at ☉ Beginning	11	46		
	1	49		
				North D.

		D. h. ' . "			P. M.
Hence, the apparent Time at <i>London</i> of the {	Beginning 1743 <i>April</i> 27	1	33	57	
	Begin. of total Darkness	2	39	41	
	True Ecliptick $\odot$	3	25	38	
	Middle	3	26	51	
	End of total Darkness	4	14	1	
	End of the Eclipse	5	19	45	
	Contin. of total Darkness	1	34	20	
{ Total Duration		3	45	48	

## The Type.



This Eclipse will not be seen in any part of *Europe*, but along in the Eastern Coast of *Africa*, Longitude  $35^{\circ}$  East from *London*, from the *Cape of Good Hope* to the South Parts of the *Red Sea*; from thence crossing *Turkey* in *Asia* to the Entrance of the *Persian Sea*, and so through the middle of the *Caspian Sea*, and by the Northern Parts of *Tartary*; these Places, I say, will see the Moon Rise in the middle of the Eclipse: so that all the *East-Indies*, and the Islands in those Seas will have the Eclipse in their Hemisphere; and all the Oriental and Southern Oceans, beyond the Antarctick Pole the Eclipse will be seen; and in *Hollandia Nova*, Lat.  $17^{\circ}$  South, and Longitude  $126^{\circ}$  East from *London*, the Moon will be vertical to them when in the middle of the total Obscuration. Lastly, in *Mar Del Zur*, Longitude  $215^{\circ}$  East from *London*, the Moon will set to them at the Time of the Middle of the Eclipse, near which lies a little Isle in the Latitude  $5^{\circ}$  South, called *Dog-Isle*.

The Third is of the Sun on *Thursday, May* the 12th in the Afternoon, invifible, as follows, in  $\Pi$  2° 3'.

	<i>D.</i>	<i>b.</i>	<i>l.</i>	<i>n.</i>
Equal Time of the true $\odot$ 1743 <i>May</i> 12	5	52	29	
Time of Reduction add		5	9	
Equal Time true Ecliptic $\odot$ at <i>Lond.</i> 12	5	57	38	
First Part of the Equation of Time add		8	25	
Apparent Time true Ecliptick $\odot$ 12	6	6	3	
Parallax { Longitude $\Delta a \odot$		45	28	
{ Latitude $\Delta a \odot$		36	1	
At one Hour after Parallax { Longit. $\Delta a \odot$		44	39	
{ Lat. $\Delta a \odot$		39	41	
Vifible hourly Motion $\Delta a \odot$		36	18	
Time from the true to the vifible $\odot$ add 1h.	15	9		
Vifible $\odot$ is 1743 <i>May</i> 12	7	21	12	
Parallax of Longitude $\Delta a \odot$ is then		44	4	
True Latitude $\Delta$ then North Afc.	1°	16	32	
Parallax of Latitude $\Delta a \odot$ Sub.		40	39	
Vifible Latitude $\Delta$ North		35	53	
Sum of the Semidiameters of $\odot \& \Delta$		32	40	

Here the Latitude of the Moon feen at *London* exceeds the Sum of the Semidiameters of the Sun and Moon proves the Invisibility of this Eclipse there, or any where in that Latitude, but in the Northern Parts of the World it will be feen, for near the Arctic Circle, *viz.* in Latitude  $66^{\circ}33'$ , the Sun's Northern Limb, will be juft touched by the  $\Delta$ 's Southern, fo that betwixt that and the North Pole it will be feen.

	<i>l.</i>	<i>n.</i>
Semidiameter of the Earth's Disk	60	5
Semidiameter of the Penumbra	32	40
Sum	1° 32	45
Difference	27	25
Moon's true Lat. at true $\odot$ N. A.	1	12 34

By this laft Work I have proved that the Eclipse will not be Central, nor total any where on the Earth, because



It will be seen in the *Orcades, Iceland, Groenland,* and Places adjacent; but if the careful Astronomer is not very diligent to attend the Time, he may chance to miss the Sight thereof, because the Duration thereof will be but small.

The Fifth is a great Eclipse of the Moon, and visible at *London* if the Air be clear; it falls on *Sunday* the 22d Day of *October* in the Morning, a *Synopsis* of the Calculation followeth.

	D.	h.	l.	".
Eq. Time of the true ☉ 1743 October 21	21	15	25	2
Time of Reduction Sub.				3
Middle Time of the true Ecliptick ☉ 21	21	15	24	59
Equation of Time add			9	37
Apparent Time at <i>London</i> 1743 Oct. 21	21	15	34	36
Mean Anomaly of ☉	4	2	46	43
	4	2	46	34
Place of the Sun a ☉	11	9	16	45
Place of the Moon in her Orbit	1	9	16	45
North Node Sub.	1	9	25	58
Argument Latitude	11	29	50	47
True Latitude ) South descending				48
Reduction add				2
Hourly Motion of ☉			2	30
			35	52
Hourly Motion ) a ☉			33	22
Sum of the Horizontal Parallaxes			59	11
Semidiameter Sun Sub.			16	24
Apparent Semidiameter Earth's Shadow			42	47
Semidiameter ) add			16	15
Sum			59	2
Lat. ) Sub.			0	48
Parts deficient			58	14
Digits Eclipsed are	21°	30	0	
Motion of half Duration		59	2	
Motion of half Darkness		26	31	
Motion from ☉ to the Middle			4	
Time of } half Duration	1h	46	9	
} half Darkness		47	41	
☉ to the Middle add				7
				Motion



		D. h.	
Motion of the Sun in half Duration			
Argument Latitude at	{ Begin.	11	28 4
	{ End	0	0 5
Latitude ) at	{ Beginning 6' 20" S.D.		
	{ End 4 43 N.A.		

		D. h. ' . "		
Hence, the apparent Time at London of the	{ Beginning 1743 October 21	15	48	34
	{ Beginning of total Dark.	14	47	2
	{ True Ecliptick ☉	15	34	36
	{ Middle, or greatest Obscu.	15	34	43
	{ End of total Darkness	16	22	24
End of the Eclipse		17	20	52
Continuance of the total Darkness		1	35	22
Total Duration of the Eclipse		3	32	18

## The Type.



This Eclipse will be seen (if the Air is clear over *Europe*, *America*, and almost in all *Africa*. In the Middle of the Eclipse the Moon is vertical; those that sail in the *Atlantic* Ocean, a little to the North-East of the *Caribbee Islands* in the Lat. of *North*.

But a very little of *Tartary* will see any thing of it; these barbarous People were capable of observing it. Suppose they are not: In 35 East Longitude in *Casraria*, a little to the North-East of *Agr*, they will see there the Moon from the total Darkness; and also in the *key*, in *Asia*, at *Tessis* in *Persia*, and on the East of the *Caspian* Sea.

But in *Oceanus Magnus*, in *Mar del Zur*, and at *Dog-Isle*, the Moon will be seen to rise in the Middle of the greatest Darkness. And now I have given the Times and Quantity, as also where it will be seen, where vertical, and where it Rises and Sets Eclipsed; therefore I have no more to add, only to advise the careful and judicious Astronomer to observe the true Times of the whole Durations, and compare them with these my laborious Calculations. *The Sun shall be no more thy Light by Day, neither for Brightness shall the Moon give Light unto thee.* Isaiah 60. 19.

The Sixth, and last Eclipse this Year, is a small and invisible one, of the greater Light, the Sun; it happens on *Sunday*, the 5th Day of *November*, at 6 in the Morning, but will be only seen in the Southern Regions, as I thus prove.

	D.	h.	'	"
Equal Time of the true $\odot$ 1743, Nov. 4	4	18	26	19
Equation of Time add			15	8
Apparent Time at <i>London</i>	4	18	41	27
Mean Anomaly of $\odot$	4	16	42	2
Mean Anomaly of $\odot$	10	7	19	14
Place of the $\odot$ at $\ominus$ and $\lrcorner$ in her Orb.	7	23	30	12
North Node sub.	1	8	40	34
Argument Latitude S. A.	6	14	49	38
True Latitude of the Moon S. A.		1	16	40
Differences of the Horizontal Parallax, $\odot$ and $\lrcorner$ is equal to the Semidiameter $\ominus$ 's Disk.			53	44
Semidiameter of the Penumbra			31	36
Sum			85	20
Difference			22	8

By this, it is plain, the Sun will be Eclipsed at the time above-mentioned, but it will only be visible to the Southern parts of the World; and it will be but small where most conspicuous, and therefore scarce worth our time to make any farther enquiry about it: with which I conclude my Account of the Eclipses for the Year of our Redemption 1743.

*Of the Luminarian Eclipses that will happen in the  
Year 1744.*

**I**N the annual Revolution of that glorious Body, the Sun, twice will the dark Body of the Moon interpose and hide its Light from us; and twice will the Earth interpose between the Sun and Moon, and deprive her of a borrowed Light; they happen in the following order.

The first will be of the Sun, on *Sunday*, the first Day of *April*, near 10 at Night; therefore invisible at *London*, as I thus prove.

	D.	h.	'	"
Equal Time of the true ☉ 1744, April 1	1	9	51	35
Equation of Time sub.				43
Apparent Time at <i>London</i>	1	9	50	52
Mean Anomaly of ☉	9	13	12	12
☽	2	29	21	3
Place of ☉ & ☽ and ☽ in her Orb ♀	0	23	16	52
North Node	1	00	48	41
Argument of Latitude	11	22	28	11
True Latitude ☽ South Desc.			39	16
Semidiameter of the Earth's Disk			55	52
Semidiameter of the Penumbra			31	53
Sum			87	45
Difference			23	59

In the South-West Parts of the World, this will be a great Eclipse; for the Center of the Shade will fall within the Disk, but all the Penumbra will not.

The Second is a Lunar Defect, and falls on *Sunday*, April 15. in the Evening, and nearly all visible at *London*, as follows.

	D.	h.	'	"
Equal Time of the true ☽ 1744, April 15	15	8	25	31
Time of Reduction, add			2	56
Equal Time of the true Eclipse ☽	15	8	28	27
Equation of Time add			9	24
Apparent Time at <i>London</i>	15	8	37	51
Mean				

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	<i>D.</i>	<i>h.</i>	<i>'</i>	<i>"</i>
Mean Anomaly of $\left\{ \begin{array}{l} \odot \\ \rangle \end{array} \right.$	9	26	56	33
Place of the Sun $\alpha \odot$	9	1	28	12
Place of the $\rangle$ in her Orbit	8	6	51	16
North Node	$\mu$	6	51	16
Argument Latitude	1	0	3	53
True Latitude $\rangle$ South Ast.	6	6	47	53
Reduction sub.			35	25
			1	31
Hourly Motion of $\left\{ \begin{array}{l} \odot \\ \rangle \end{array} \right.$			2	25
			33	24
Hourly Motion $\rangle \alpha \odot$			30	59
Sum of the Horizontal Parallaxes			56	49
Semidiameter $\odot$ sub.			16	9
Semidiameter of the Earth's Shadow			40	40
Semidiameter $\rangle$ add			15	42
Sum			56	22
Latitude $\rangle$ sub.			35	25
Parts deficient			20	57
Digits Eclipsed are		8°	0	0
Scruples of Incidence			43	51
Motion from the Middle to the $\oslash$			3	2
Time of Incidence sub. & add		1 <sup>h</sup>	24	55
Time from the Middle to the true $\oslash$ sub			5	52
Motion of the $\odot$ in the time of Incidence			3	25
Argument Latitude at $\left\{ \begin{array}{l} \text{Beginning} \\ \text{End} \end{array} \right.$	6	6	0	7
	6	7	34	39
			'	"
True Lat. $\rangle$ at the $\left\{ \begin{array}{l} \text{Beginning} \\ \text{End} \end{array} \right.$	31	20	} S. A.	
	39	31		
	<i>D.</i>	<i>h.</i>		
Hence, the ap- parent Time at London of the	Beginning	7	7	4
	Midd. or greatest Darkness	8	31	59
	Ecliptic $\oslash$	8	37	51
	End	9	56	54
	Total Duration	2	49	50
				} P. M.

## The Type.



At *London*, that Night, the Sun sets at  $7^h 12' 12''$ , and the ☾ rises at  $7^h 14' 28''$ ; by which, I see the Eclipse begins  $7' 24''$  before ☾ rises.

Either by the Calculation, or Type above, you may see that two Thirds of the ☾'s Diameter on the North side will fall within the Earth's Shadow, and that she rises at *London* with a black Forehead-Cloth, as this Type sheweth.

## The Type.



At the middle of the Eclipse, the Moon will be vertical to the North-East parts of *Madagascar-Isle*; it will be visible to all *Europe*, *Africa* and *Asia*, except the North-East Parts of *Tartary* and *Japan*; she will be seen to rise in the middle or greatest Darkness at *Faro-Isles*, and in the Ocean to the Westward of *Ireland*,  $5^\circ$ , and on the Eastern Coast of South *America*: and at the same time she will be seen to set at the *Philippine Islands*, and places adjacent, in the *East-Indies*.

The Third is of the Sun, and invisible at *London*, on *Tuesday*, *September 25th*, in the Morning, as follows.

Equal



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	D.	h.	'	"
Equal Time of the true ☿ 1744, <i>Sept.</i>	24	13	16	23
Equation of Time add			12	6
Apparent Time at <i>London</i>	24	13	28	29
Mean Anomaly of { ☉	3	6	48	38
{ ☾	7	20	38	43
Place of the ☉ & ☾, and ♃ in her Orb.	6f.	15°	2	41
Ascending Node sub.	0	21	29	15
Argument of Latitude	5	21	33	26
True Latitude of the Moon's N. D.			43	59
Semidiameter of the Earth's Disk			58	36
Semidiameter of the Penumbra			32	37
Sum			91	13
Difference			25	59

This will be a great Eclipse in our Parallel, and 180 Degrees of Longitude from *London*, which place is incognita; for it is not yet certainly known whether North *America* joins to the North-East Parts of *Tartary*, or whether it be Sea: but be that as it will, the Eclipse in those Parts will be very conspicuous, for the Center of the Penumbra will fall within the Earth's Disk.

The last Eclipse this Year, falls on *Wednesday*, the 10th of *October*, near Noon, so invisible at *London*: the Requisites in the Calculation stands thus.

	D.	h.	'	"
Equal Time of the true ☿ 1744, <i>Oct.</i>	10	0	48	21
Time of Reduction add			3	30
Equal Time of the true Ecliptic ☿	10	0	51	51
Equation of Time add			8	6
Apparent Time	10	0	59	57
Mean Anomaly of { ☉	3	22	3	57
{ ☾	2	12	53	20
Place of the Sun from the Earth	≈	28	25	13
Place of the Moon in her Orb	0	28	25	13
Moon's North Node	0	20	39	54
Argument of Latitude	0	7	45	19
True Latitude ☾ N. Ascending			40	26

Re-

Reduction sub.		1	44
Hourly Motion of $\left\{ \begin{array}{l} \odot \\ \text{D} \end{array} \right.$		2	30
Hourly Motion of $\text{D} \propto \odot$		32	20
Sum of the Horizontal Parallaxes		29	50
		55	48
Semidiameter of $\left\{ \begin{array}{l} \odot \\ \ominus \text{ Shadow} \end{array} \right.$		16	21
		39	27
		15	26
Sum		54	53
Latitude $\text{D}$		40	26
Parts deficient		14	27
Digits eclipsed are	$5^{\circ}$	37	4
Scruples of Incidence		37	8
Motion from the middle to $\propto$		3	27
Time of Incidence, sub. and add	$1^h$	14	41
Time from the middle to the $\propto$ sub.		6	56
Motion of the Sun in time of Incidence		3	7
Argument Lat. at $\left\{ \begin{array}{l} \text{Beginning} \\ \text{End} \end{array} \right.$	$\circ$	7	5
	$\circ$	8	25
Lat. $\text{D}$ at $\left\{ \begin{array}{l} \text{Beginning} \\ \text{End} \end{array} \right.$	N. A.	36	57
	N. A.	43	54

		<i>D. h. ' "</i>			
Hence the ap- parent Time at London of the	{	Beginning 1744, Oct.	9	23	38 20
		Middle	10	0	53 1
		True Ecliptic $\propto$	10	0	59 57
		End	10	2	7 42
		Total Duration	2	29	22
		} P.M.			

The Type.



This

This Eclipse will not be seen at *London*, but to our Antipodes it will be very conspicuous; and in the *Oceanus Magnus*, and *Mar del Zur*: it will be seen in all the North-West Parts of *America*, and in *Hudson's-Bay*; at *Zelandia Nova*, *Van Diemens*, *Hollandia Nova*; in the greatest part of *Tartary*, in *China*, and in all the Eastern Islands. At the middle of the Eclipse, the Moon will be vertical to the great Ocean, a little to the South-West of the Isle *St. Pedro*; Latitude  $11^{\circ}$  North, Longitude  $179^{\circ}$ .

At the Western Coasts of *Carolina*, *Virginia*, *Maryland* and *Pensilvania*, the Moon will be seen to rise in the middle of the Eclipse; and at *Benores*, in the *Mogul's Empire*, and at the very North-East Borders of *Muscovia* and places adjacent, the Moon will be seen to set in the middle of the greatest Darkness.

*I will cover the Heaven, and make the Stars thereof dark: I will cover the Sun with a Cloud, and the Moon shall not give her Light.* Ezekiel 32. 7.

Of the ECLIPSES of the Sun and Moon that will happen in the Year of our Lord God 1745.

Within the Circumference of this Year, there will be only two Solar Eclipses; and both invisible at *London*, according to the following Demonstrations.

The first of these will fall on *Friday, March 22.* in the Morning, according to the following Account.

	D.	h.	'	"
Equal Time of the true $\odot$ 1745, Mar. 21	14	47	6	
Equation of true Time sub.		3	55	
Apparent Time at <i>London</i>	21	14	43	11
Mean Anomaly of $\odot$	9	2	18	28
Mean Anomaly of $\odot$	1	7	1	54
Place of $\odot$ at $\odot$ , and $\odot$ in her Orbit	0	12	27	28
Moon's North Node	0	12	3	3
Argument				

	D.	b.	'	"
Argument Latitude	0	0	24	25
True Latitude $\bowtie$ North Ascend.			2	7
Semidiameter of the Earth's Disk			53	7
Semidiameter of the Penumbra			31	13
Sum			84	20
Difference			21	54

This will be a very great Eclipse in it self, for the Penumbra doth all fall within the Disk; it will be very formidable to our Antipodes, but in the *East-Indies* much greater than to them: for in the North *Philippine-Isles*, the Sun at the time of the Eclipse will be vertical, in the Latitude of about  $5^{\circ}$  North, and Longitude East from *London*  $139^{\circ}$ .

The Second of these Solar Defects, falls on *Sunday, September 14th*, in the Afternoon, as follows.

	D.	b.	'	"
Middle Time, true $\sigma$ 1745, <i>Sept.</i>	14	5	2	18
Time of Reduction sub.				2
Equal Time, true Ecliptic $\sigma$	14	5	2	16
Equation of Time add				52
Apparent Time at <i>London</i> .	14	5	3	8
Mean Anomaly of $\left\{ \begin{array}{l} \odot \\ \bowtie \end{array} \right.$	2	26	21	39
	6	4	13	33
Place of the Sun and Moon	6	2	36	35
Moon's North Node	0	2	42	20
Argument Latitude	5	29	54	15
True Latitude $\bowtie$ N. D.				30
Reduction add				1
Hourly Motion of $\left\{ \begin{array}{l} \odot \\ \bowtie \end{array} \right.$			2	27
			38	9
Hourly Motion of the $\bowtie a \odot$			35	42
Semidiameter of the Earth's Disk			60	18
Semidiameter of the Penumbra			32	53
Sum			93	11
Difference			27	25
Parallax of $\left\{ \begin{array}{l} \text{Longitude } \bowtie a \odot \\ \text{Latitude } \bowtie a \odot \end{array} \right.$			14	28
			51	57

Here,



Here, the Parallax of Latitude  $\propto a \odot$ , at the time of the true  $\odot$ , is within  $20''$  as great as it can be at *London*, and the visible  $\odot$  will succeed the true; therefore the Sun's Altitude will be less at the visible  $\odot$  than it is now, and consequently the Parallax in Latitude of  $\propto a \odot$  will then far exceed the Sum of the Semidiameters of the Luminaries, by which the Moon is far deprefs'd below the Sun's Limb, which proves it inconspicuous at *London*: but, notwithstanding, it will be a very great Eclipse in it self, viz. both Total and Central in *America*, for the Penumbra doth all fall within the Earth's Disk. But, because I find it will be visible at *Port-Royal* in *Jamaica*, and near their Meridian too; I will therefore give the time of it at that Place, that our *English* residing there, may thereby correct the Longitude of that Place, if need require.

		D. h. ' "		
Hence, the apparent Time at <i>Port-Royal</i> in <i>Jamaica</i> , of the	{ Beginning 1745, <i>Sept.</i> 13	22	15	20
	{ Midd. or greatest Darkn.	23	35	18
	{ Visible Conjunction	23	38	29
	{ End of the Eclipse	14	0	49 24
	{ Total Duration	2	34	4
	{ Digits Eclipsed are	7°	0	0
				P. M.

Lat. $\propto$ seen at the	{ Beginning	2	58	} S. A.
	{ End	23	48	

The Type.





Of the *ECLIPSES* of the Luminaries that will fall in the Year of Human Redemption 1746.

According to Astronomical Computation, there will be four Eclipses within this Year's Revolution, viz. two of the greater Light, the Sun; and as many of the lesser Light, the Moon: and they happen in this following order.

The first is a partial Eclipse of the Moon, invifible at *London*, for the Eclipse ends 22' 44" e'er the Moon riles there; it falls on *Monday, February 24th*, in the Afternoon, according to the following Calculation.

	D.	h.	'	"
Equal Time of the true ☿ 1746, Feb. 24	24	3	45	23
Time of Reduction sub.			2	43
Middle Time, true Ecliptic ☿	24	3	42	40
Equation of Time, first part sub.			4	11
Apparent Time at <i>London</i>	24	3	38	29
Mean Anomaly of ☾	8	6	57	33
Place of the ☾ a ☾	5	3	7	42
Place of the ☾ in her Orbit	5	16	59	28
Moon's North Node	11	24	5	30
Argument Latitude	5	22	53	58
True Latitude ☾'s North Descending			37	2
Reduction add			1	35
Hourly Motion of ☾			2	30
Hourly Motion ☾ a ☾			37	33
Sum of the Horizontal Parallaxes			35	3
Semidiameter ☾			60	49
Apparent Semidiameter of the ☾'s Shadow			16	21
Semidiameter ☾			44	28
Sum			16	35
Latitude ☾			61	3
Parts deficient			37	2
Digits Eclipsed are			24	1
Scruples of Incidence		8°	41	0
			48	32
				Motion

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Motion from the ☿ to the Middle	3	10	
Time of Incidence, sub. and add	1	23	6
Time from ☿ to the Middle add	5	25	
Motion of the ☾ in time of Incidence	3	28	
Argument of Lat. at { Beginning	5	22	1 58
{ End	5	23	45 58

Lat. ☽ at { Beginning	41	32	} N. D.
{ End	32	32	

D. h. ' "

Hence the ap- parent Time at London of the {	Beginning 1746, Feb.	24	2	20	48
	Ecliptic ☿		3	38	29
	Middle		3	43	54
	End		5	7	0
	Total Duration		2	46	12

The Eclipse ends 22' 44" e'er the ☽ rises at London.

## The Type.



This Eclipse will be seen in *Asia*, part of *Africa* and *Europe*; the Moon at the time of the middle of the Eclipse, is vertical a little to the South of the great Island *Mindano*, one of the *Philippine*-Isles, in Latitude 5° North, and East Longitude from *London*, 123° and a half. The Moon will be seen to rise in the middle of the Eclipse, at the Mountains *Zambas*, *Mon-gale*, on the Eastern Coasts of *Africa*, Latitude 13° South, Longitude 35° East from *London*, and on the

Eastern Coast of the *Archipelago*, in the *Baltic Sea*, and in *Norway*; it will be seen in the Eastern Parts of *Swedeland* and *Poland*, in all *Muscovia*, at *Cyprus*, in the *Red-Sea*, and at *Madagascar*. The places where she is seen to set in the middle of the Eclipse, falls in the vast Ocean, and *Mar del Zur*, between *Dog-Isle* and *Waterland*.

The Second is a Solar Defect, and happens on *Tuesday, March 11th*, in the Morning early, and consequently not to be seen in the Horizon of *London*; it happens as follows.

	D.	h.	'	"
Equal Time of the true $\odot$ 1746, Mar.	10	14	55	26
Equation of Time sub.			7	25
Apparent Time at <i>London</i>	10	14	48	1
Mean Anomaly of $\odot$	8	21	12	57
Mean Anomaly of $\oslash$	11	12	6	26
Place of $\odot$ $\oslash$ and $\oslash$ in her Orbit	0	1	22	14
Moon's North Node	11	23	19	2
Argument of Latitude	0	8	3	12
True Latitude of the Moon's N. A.			41	59
Semidiameter of the Earth's Disk			52	37
Semidiameter of the Penumbra			31	11
Sum			83	48
Difference			21	26

This will be a central Eclipse, but all the Penumbra doth not fall within the Earth's Disk; it will be very great about the *Japon-Isles*, and places adjacent; the Sun will then be vertical a little to the South of the North *Philippine Isles*.

The Third is a *Lunar Deliquium*, and visible at *London*, (if Clouds interpose not) on *Tuesday*, the 19th Day of *August*, as follows.

	D.	h.	'	"
Equal Time of the true $\oslash$ 1746, Aug.	19	12	8	21
Time of Reduction sub.			3	25
Middle Time of the true $\oslash$	19	12	4	56
Equation of Time sub.			6	52
Apparent				



	<i>D.</i>	<i>h.</i>	<i>'</i>	<i>"</i>
Apparent Time	19	11	58	4
Mean Anomaly of $\left\{ \begin{array}{l} \odot \\ \text{D} \end{array} \right.$	2	0	46	7
	9	27	7	30
Place of the $\odot$ & $\ominus$	$\text{M}$	7	17	33
Moon in her Orbit	11	7	17	33
Moon's North Node	11	14	44	24
Argument Latitude	11	22	33	9
True Latitude $\text{D}$ South Descending			38	51
Reduction add			1	40
Hourly Motion of $\left\{ \begin{array}{l} \odot \\ \text{D} \end{array} \right.$			2	25
			31	42
Hourly Motion of $\text{D}$ & $\odot$			29	17
Sum of the Horizontal Parallaxes.			55	14
Semidiameters of $\left\{ \begin{array}{l} \odot \\ \ominus \\ \text{D} \end{array} \right.$			16	8
			39	6
			15	17
Sum			54	23
Latitude $\text{D}$			38	51
Parts deficient			15	32
Digits Eclipsed are	6 <sup>o</sup>	6	0	
Scruples of Incidence			38	3
Motion from $\odot$ to the middle			3	19
Time of Incidence Sub. and add	1	17	58	
Time from $\odot$ to the Middle add			6	48
Motion of $\odot$ in the Time of Incidence			3	8
Argument Latitude at $\left\{ \begin{array}{l} \text{Beginning} \\ \text{End} \end{array} \right.$	11	21	51	58
	11	23	14	20
Lat. $\text{D}$ at $\left\{ \begin{array}{l} \text{Beginning} \\ \text{End} \end{array} \right.$	43	24	} S. D.	
	35	16		

	<i>D.</i>	<i>h.</i>	<i>'</i>	<i>"</i>
Hence, the ap- parent Time at London of the	} P.M.			
Beginning is 1746, Aug. 19				
Ecliptic $\odot$				
Middle, or greatest Dark.				
End of the Eclipse				
Total Duration	2	35	56	

## The Type.



*The Sun shall be turned into Darknes, and the Moon into Blood, before the great and terrible Day of the Lord come. Joel 2. 31. Acts 2. 20.*

This Eclipse will be seen in *Europe, Africa*, part of *Asia*, and in South *America*, the Moon at the middle of the Eclipse is vertical in the *Ethiopian* Ocean about  $6^{\circ}$  to the Northward of *St. Helena*. The Moon will be seen to rise Eclipsed in *Carolina, Virginia*, and places adjacent. And in the North-East Parts of *Muscovia*, they will at the same time see her set in the middle of the Eclipse; and also at *Orixa*, in the *East-Indies*, and places adjacent.

The Fourth and last Eclipse this Year, falls on *Thursday, September 4th*, in the Forenoon, and is of the Sun, invisible at *London*, as I thus prove.

	D.	b.	1	n
Equal Time of the true $\odot$ 1746, Sept.	3	21	21	51
Time of Reduction add			3	14
Equal Time, true Ecliptic $\odot$ at London	3	21	25	5
Equation of Time sub.			2	33
Apparent Time	3	21	22	32
Mean Anomaly of $\odot$	2	15	56	2
Place of the Sun and Moon	4	18	6	49
Moon's North Node sub.	5	22	15	34
Argument of Latitude	11	13	55	10
True Latitude $\odot$ South Ascending	6	8	20	24
Reduction sub.			43	27
Hourly Motion of $\odot$			1	51
Hourly Motion of $\odot$			2	26
Hourly Motion of $\odot$ a $\odot$			36	48
			34	22
				Se-



Semidiameter of the Earth's Disk	59	7
Semidiameter of the Penumbra	32	37
Sum	91	44
Difference	26	30
Parallax of Longitude $\rangle a \odot$	39	1
Parallax of Latitude $\rangle a \odot$	32	10
Visible Latitude of the Moon's South	1° 15	37

Here, at the time of the true  $\sigma$ , the Latitude of the  $\rangle$  seen so far, exceeds the Sum of the Semidiameters of the Luminaries, that I see it will be so at the visible  $\sigma$  also, and consequently it will be inconspicuous at *London*; for which reason I shall forbear the other part of the Calculation: but it will be a central Eclipse in itself, and in the Southern Parts of the Earth very great. The Sun will be vertical at the middle of the Eclipse, to the Mountains of *Ganca*, in *Ethiopia*, Lat.  $3^{\circ}$  North, and  $37^{\circ}$  East Longitude from *London*. So I shall conclude all with the Words of the Prophet *Jeremiah*, Chap. 10. verse 2. *Thus saith the Lord, learn not the way of the Heathen, and be not dismayed at the Signs of Heaven, for the Heathens are dismayed at them.*

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*Of the ECLIPSES of the Sun and Moon that will happen in the Year of Human Redemption 1747.*

THE first Eclipse this Year, is a small one, of the Sun, on *Thursday*, the 29th Day of *January*, in the Afternoon, but will not be seen at *London* if the Air be ever so clear, as I thus prove.

	D.	h.	'	"
Equal Time of the true $\sigma$ 1747, Jan.	29	2	57	52
Equation of Time sub.			14	57
Apparent Time at <i>London</i>	29	2	42	55
				Mean

	D.	<i>h.</i>	<i>′</i>	<i>″</i>
Mean Anomaly of $\left\{ \begin{array}{l} \odot \\ \end{array} \right.$	7	11	2	40
	8	21	42	50
Place of the $\odot$ $\alpha$ $\ominus$ , and $\triangleright$ in her Orb	10	20	34	58
Moon's North Node.	11	6	7	36
Argument Latitude	11	14	27	22
True Latitude $\triangleright$ South Descending		1	20	17
Semidiameter of the Earth's Disk			56	32
Semidiameter of the Penumbra			32	19
Sum			88	51
Difference			25	13

This Eclipse will no where be Central, it will be but very small where visible; the Sun will be vertical at the time of the Eclipse, near the middle of *Brazil*, in South *America*, Lat.  $15^{\circ}$  South, and Longitude  $44^{\circ}$  West from *London*.

The Second is a Lunar Defect, and falls on *Saturday*, *February* 14th, (or if you please, on *Valentine's* Day) in the Morning, visible at *London*, according to the following Calculation.

	D.	<i>h.</i>	<i>′</i>	<i>″</i>
Equal Time of the true $\odot$ 1747, <i>Feb.</i> 13	13	17	9	56
Time of Reduction add				26
Middle Time of the true Ecliptic $\odot$	13	17	10	22
Equation of Time sub.			7	6
Apparent Time at <i>London</i>	13	17	3	16
Mean Anomaly of $\left\{ \begin{array}{l} \odot \\ \end{array} \right.$	7	26	24	41
	3	15	25	40
Place of the $\odot$ $\alpha$ $\ominus$	X	6	17	40
Place of the Moon in her Orb	5	6	17	40
Moon's North Node	11	5	18	36
Argument of Latitude	6	0	59	4
True Latitude $\triangleright$ South Ascending			5	9
Reduction sub.				14
Hourly Motion of $\left\{ \begin{array}{l} \odot \\ \end{array} \right.$			2	31
			34	39
Hourly Motion $\triangleright$ $\alpha$ $\odot$			32	8
Sum of the Horizontal Parallax			58	0
Semidiameter of the Sun			16	24

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Semidiameter Earth's Shadow	41	36
Semidiameter D	15	58
Sum	57	34
Latitude D	5	9
Parts deficient	52	25
Digits Eclipsed	19° 42	0
Scruples of Incidence	57	20
Motion from Middle to ☉		25
Motion of half Darknes	25	6
Time of { half Duration	1	47
Time of { half Darknes	46	53
Time of { from Middle to ☉		47
Motion of the ☉ in Time of Incidence	4	29
Argument Lat. at { Beginning	5	29
Argument Lat. at { End	6	2
		0
		53
Latitude D at { Beginning	0	14
Latitude D at { End	10	32
		North D.
		South A.

## The Type.



Note, The Sun riseth that Morning at *London*, at 6h 47' 12", and the D sets at 6h 47', by which you see the Eclipse nearly ends as the D sets.

Q

Hence,

Hence, the apparent Time at London of the {		D.	h.	m.	s.
	Beginning 1747, February 13	15	15	25	
	Beginning of total Darknefs	16	15	36	
	Middle, or greatest Darknefs	17	2	29	
	True Ecliptic $\phi$	17	3	16	
	End of total Darknefs	17	49	22	
	End of the Eclipse	18	49	33	
	Continuance of total Darknefs	1	33	46	
	Total Duration	3	34	8	

## R E A D E R,

*If you would know how these Eclipse' are made,  
Moon's is by th' Earth's thick interposing Shade;  
Which doth Eclipse the Brows of Cynthia bright,  
And her brown Shadows, quench her Brother Light.*

This Eclipse will be seen in part of *Europe*, part of *Africa*, and in all *America*; the Moon in the middle of the Eclipse will be vertical a little to the East of *Porto Bello*, in *South America*, Latitude  $9^{\circ}$  North, and  $79^{\circ}$  West from *London*; the Moon will set Eclipsed at *Varsiga* in *Russia*, a little to the Westward of *Arkangel*; on all the Western Coasts of *Muscovia*, at *Leopol* in *Poland*, in *Greece*, and so the Horizon of the setting Moon, in the middle of the Eclipse, crosses the *Mediterranean Sea*, in Longitude  $12^{\circ}$  East from *London*, and passes by *Barca*, through *Tripoli*, *Barbary*, *Nigritia*, and the most remote Parts of *Guinea*, where it leaves the Continent on the Western Parts of *Africa*, Lat.  $2^{\circ}$  South,  $12^{\circ}$  East from *London*, and from thence it passes through the *Ethiopian Ocean*, to the *Antarctic Circle*. The Horizon of the rising Moon in the middle of the Darknefs, passes through the *Oceanus Magnus*, and *Mar del Zur*, crossing the Equator, in  $168^{\circ}$  of West Longitude, from the Meridian of *London*, that is  $5^{\circ}$  to the Westward of the Isle *Tuberones*.

The Third Eclipse this Year, is of the greater Light, the Sun, invisible at the Metropolis of Great-Britain;

it will be on *Saturday*, the 28th Day of *February*, in the Morning, before Sun-rising, according to the following Calculation.

<i>At London 1747.</i>	D.	h.	'	"
Middle Time, true & February	27	17	18	27
Equation of Time sub.			10	42
Apparent Time at London	27	17	7	45
Mean Anomaly of $\left\{ \begin{array}{l} \odot \\ \text{ } \end{array} \right.$	8	10	12	57
	9	10	25	19
Place of the $\odot$ , $\alpha$ $\ominus$ , and $\gamma$ in her Orb	11	20	18	12
Moon's North Node	11	4	53	43
Argument Latitude	0	15	44	29
True Lat. $\gamma$ N. A.		I	21	17
Semidiameter of the Earth's Disk			54	44
Semidiameter of the Penumbra			51	45
Sum			86	29
Difference			22	50

This will be but a small Defect in itself, for it will no where on the Earth be Central, for a very small Segment of the Penumbra falls within the Earth's Disk. The Sun at that time will be vertical to *Mantabay*, in  $4^{\circ}$  South Latitude, and  $99^{\circ} 15'$  East Longitude: but, although the Sun is then vertical to these parts of the *East-Indies*; yet, I say, they will not see any Eclipse there, for the  $\Psi$  will then by her Parallax be thrown to the Northward of the Sun; in *Tartary*, it will only be seen.

The Fourth is of the Sun also, and it will be visible at *London*, in the Morning, on *Sunday, July 26th*. Take the following farther Account of it.

	D.	b.	'	"
Equal Time of the true $\odot$ 1747 <i>July</i>	25	20	50	47
Time of Reduction sub.			6	0
Equal Time of the true Ecliptic $\odot$	25	20	44	47
Equation of Time sub.			9	56
Apparent Time at <i>London</i>	25	20	34	51
Q. 2				Mean



	D.	h.	'	"
Mean Anomaly of $\begin{cases} \odot \\ \text{ } \end{cases}$	1	6	13	47
Hourly Motion of the $\begin{cases} \odot \\ \text{ } \end{cases}$	2	3	57	53
Place of the Sun and Moon	4	13	19	25
Moon's North Node	10	26	43	14
Argument Latitude	5	16	36	11
True Latitude of the $\odot$ N. D.	1	9	25	
Reduction add		2	56	
Semidiameter of the $\begin{cases} \text{Earth's Disk} \\ \text{Penumbra} \end{cases}$		54	17	
Parallax of $\begin{cases} \text{Longitude } \odot \\ \text{Latitude } \odot \end{cases}$		55	7	
At one Hour before apparent $\sigma$ , viz.	25	19	34	51
Parallax of $\begin{cases} \text{Longitude } \odot \\ \text{Latitude } \odot \end{cases}$		49	5	
Visible hourly Motion of $\odot$		26	21	
Interval of the true and visible $\sigma$ sub.	1	26	33	
Visible $\sigma$ is 1747 July	25	19	8	18
Parallax of $\begin{cases} \text{Longitude } \odot \\ \text{Latitude } \odot \end{cases}$		41	42	
Moon's true Latitude then N. D.	1	13	15	
Visible Latitude $\odot$ N. D.		46	17	

This far exceeding the Sum of the Semidiameters of the Luminaries, proves it cannot be seen at *London*, be the Morning ever so serene; but in the Latitude of  $80^{\circ}$  North, there the Sun will be  $1^{\circ} 24'$  Eclipsed on the North, or upper side thereof: the Center of the Penumbra doth no where fall within the Disk of the Earth, so 'twill be but small where most visible, which is in the Arctic Circle,

At the time of the Eclipse, the Sun will be vertical to *Arabia Felix*,  $5^{\circ}$  to the East of the *Red-Sea*, Latitude  $17^{\circ}$  North, and Longitude from *London*  $45^{\circ}$  East.

The Fifth is a Lunar Defect, this will be total, and visible at *London*, on *Sunday*, the 9th Day of *August*, at 8 in the Morning, by the annexed Calculation.

Equal

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	D.	b.		
Equal Time of the true ☉ 1747, Aug. 8	8	20	51	36
Time of Reduction add				20
Equal Time of the true Ecliptic ☉	8	20	51	56
Equation of Time sub.			2	57
Apparent Time at London	8	20	48	59
Mean Anomaly of ☉	1	20	1	44
	8	6	52	21
Place of the ☉ a ☉	9	26	46	48
Place of the Moon in her Orbit	10	26	46	48
Moon's North Node	10	25	58	14
Argument of Latitude	0	0	48	34
True Latitude ☉ N. Ascending			4	14
Reduction sub.				11
Hourly Motion of ☉			2	24
			35	12
Hourly Motion of ☉ a ☉			32	48
Sum of the Horizontal Parallaxes			58	32
Semidiameter of the Sun			16	5
Semidiameter of the Earth's Shadow			42	27
Semidiameter ☉			16	6
Sum			58	33
Moon's true Latitude			4	14
Parts deficient			54	19
Digits eclipsed are	20	14	50	
Scruples of Incidence			58	24
Motion of half Darknefs			26	0
Motion from the Middle to ☉			0	21
Time of { half Duration		16	46	51
{ half Darknefs			47	53
{ from Middle to ☉ sub.			0	33
Motion of the Sun in time of Incidence			4	16
Sum sub. and add			1	2
Argument Lat. at { Beginning	11	29	45	54
{ End	0	1	51	14
Lat. ☉ at { Beginning	1	13	S. D.	
{ End	9	41	N. A.	

Hence

Hence, the apparent  
Time at London of  
the

Beginning 1747, <i>August</i>	<i>D. h. ' "</i>
Beginning of total Darknefs	8 19 1 30
Middle, or greatest Darknefs	20 0 48
True Ecliptic $\phi$	20 48 21
End of total Darknefs	20 48 59
End of the Eclipse	21 35 54
Continuance of total Darknefs	22 35 12
Total Duration	1 35 6
	3 33 42

## The Type.



This Eclipse will be seen (if the Air is clear) in all Parts of *America*, except the most Eastern Parts of *Brazil*; in *Terra Carpentaria*, and in the most Eastern known Places of the *East-Indies*. At the time of the middle of the Eclipse, the  $\Delta$  is vertical in the Ocean, called *Mar del Zur*, Latitude  $12^{\circ}$  South, and Longitude  $134^{\circ}$  West from *London*. And then the  $\Delta$  will be seen to rise in *Brazil*, and to set at the same time totally Eclipsed in *Terra de Papos*, North *Philippine*, and *Ladrones-Isles*, and places adjacent. It will be a very great Eclipse, the Moon continues  $1^h 35' 6''$  involv'd in the dark Shadow of the Earth.

The Sixth and last Eclipse this Year, will be of the Sun, on *Monday, August 24th*, (or if you please, on *St. Barikolomew's Day*) at Night, and invisible at *London*, as follows.

	<i>D. h. ' "</i>
Equal Time, true $\phi$ 1747, <i>August 24</i>	9 28 21
Equation of Time add	1 28
Apparent Time at <i>London</i>	24 9 29 49
	Mean

	D.	b.	'	"
Mean Anomaly of $\left\{ \begin{array}{l} \odot \\ \end{array} \right.$	2	5	19	51
Place of the $\odot$ $\alpha$ $\ominus$ , and $\gamma$ in her Orb.	2	29	43	24
Moon's North Node	5	11	48	2
Argument Latitude	10	25	8	44
True Latitude $\gamma$ S. A.	6	16	59	18
Semidiameter of the Earth's Disk			55	54
Semidiameter of the Penumbra			31	50
Sum			87	44
Difference			24	4

This will be but a very small Eclipse where visible, which will be in the Southern Parts of *America*; for the Sun will then be vertical in the vast Western Ocean, in Latitude  $7^{\circ}$  North, and Longitude  $135^{\circ}$  West from *London*. The time of the Passage of the Penumbra over the Earth's Disk, will be as followeth.

	°	'	"
Declination of the $\odot$ North	7	9	0
Angle of the $\gamma$ 's visible Way with Eclipt.	5	31	0
Hourly Motion of $\left\{ \begin{array}{l} \odot \\ \gamma \end{array} \right.$		2	25
Hourly Motion of the $\gamma$ $\alpha$ $\odot$		33	29
The Angle of Incidence		31	4
Motion of half Duration $1075''$	11	47	0
Time of half Duration, sub. and add		17	55
Reduction sub.		54	36
Time of Reduction sub. and add		3	32
Nearest Approach. of Center, Penumbra and Disk	24	9	26
Ecliptic $\phi$	24	9	33
Penumbra first touches the Disk	24	8	51
Penumbra goes off, and Eclipse ends	24	10	0
Total Duration of this general Eclipse	1	9	12

The Center of the Penumbra being far removed out of the Earth's Disk, is the Cause the Eclipse is so very small in itself.



Of the ECLIPSES of the Sun and Moon that will happen in the Year of our Redemption 1748.

Within the Compass of this Year, 1748, there will happen four Eclipses of the Luminaries, two of each Light; two of which will be visible at *London*, (*viz.* one of each) and the other two will not; they happen in the following order.

The first is a Solar Defect, on *Monday, January* the 18th Day, 15 Hours P. M. or on *Tuesday Morning*, invifible at *London*, according to the annexed Calculation.

	D.	h.	'	"
Equal Time of the true $\odot$ 1748, Jan. 18	18	15	22	47
Equation of Time sub.			13	56
Apparent Time at <i>London</i>	18	15	8	51
Mean Anomaly of $\left\{ \begin{array}{l} \odot \\ \text{D} \end{array} \right.$	7	0	27	24
	7	3	29	21
Place of the $\odot$ & $\ominus$ , and $\text{D}$ in her Orb	10	9	43	4
Moon's North Node	10	17	20	58
Argument of Latitude	11	22	22	6
True Latitude $\text{D}$ S. D.			39	47
Semidiameter of the Earth's Disk			59	33
Semidiameter of the Penumbra			33	1
Sum			92	34
Difference			26	32

The Center of the Penumbra will fall within the Earth's Disk, but all the Penumbra will not, because the Moon's Latitude exceeds the Difference between the Earth's Disk and Penumbra; it will be invifible at *London* for thefe two Causes, *viz.* First, because it happens under the Horizon of *London*; and, Secondly, because the Moon has great South Latitude, which in Northern Latitudes, will be increased by her Parallax, in Latitude, and that Sum will far exceed the Semidiameter of the Luminaries. The Sun will then be vertical to *Hollandia Nova*, Latitude  $16^{\circ} \frac{1}{2}$  South, and



and Longitude East from *London* 130°, it will be most conspicuous about our Antipodes.

The Second is of the Moon, on *Wednesday, February* 3d, near Noon, which falling so near the Meridian of *London*, cannot be seen there; a Synopsis of the Calculation stands thus.

	D.	h.	'	"
Equal Time of the true ☉ 1748, Feb.	2	23	49	9
Equation of Time sub.			14	56
Apparent Orbit ☉	2	23	34	4
Reduction in Time add			4	3
Apparent Ecliptic ☉ at <i>London</i>	2	23	38	7
Mean Anomaly of ☉	7	15	35	14
	1	24	3	55
Place of the ☉ a ☉	25	15	22	
Place of the Moon in her Orbit	4	25	15	22
Moon's North Node	10	16	32	50
Argument Latitude	6	8	42	32
True Latitude ☉ South Asc.			45	22
Reduction sub.			1	56
Hourly Motion of ☉			2	31
			31	9
Hourly Motion ☉ a ☉			28	38
Sum of the Horizontal Parallaxes			54	47
			16	26
Semidiameters of ☉ Shadow			38	21
			15	10
Sum			53	31
Latitude ☉			45	22
Parts deficient			8	9
Digits Eclipsed are	3°		14	22
Scruples of Incidence			28	23
Motion from Middle to ☉			3	51
Time of Incidence sub. and add			59	29
Time from Middle to ☉ sub.			8	4
Motion of the ☉ in time of Incidence			2	30
Sum			30	53
Argument Latitude at ☉ Beginning	6	8	11	39
☉ End	6	9	13	25
R				Lat.

Hence, the ap- parent Time at <i>London</i> of the	True Lat. $\circ$ at the	{ Beginning End				
					42 42 } S. A. 48 1 }	
			<i>D.</i>	<i>b.</i>		
	{ Beginning Middle Opposition End	1748, Feb. 2	22	30	34	} P.M.
			23	30	3	
			23	38	7	
			3	0	29 32	
	Total Duration		1	58	58	

## The Type.



This Eclipse will only be seen in part of *Asia*, and North *America*; the Moon at the middle is vertical to the great Western Ocean, Latitude  $13^{\circ}$  North, and Longitude  $166^{\circ}$  West from *London*. The Horizon of the rising Moon passes through the North Parts of *New England*, *Hispaniola*, and by the most Western Parts of *Peru*, and also by *Ball*, in *Groenland*: here, I say, the Moon will be seen to rise at the time of the middle of the Eclipse. Likewise, at the same time she will be seen to set at *Armas*, in the middle of *Tartary*, on the Western Coasts of *China*, at *Siam* in *Persia*, at *Sumatra* and *Java*, and on the Western Coasts of *Leurwin's Land*.

The Third Eclipse this Year, is a great and visible one, of the glorious Body, the Sun, (or rather of the Earth) on *Thursday*, the 14th Day of *July*, in the Morning, at *London*, as followeth.

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	D.	b.	s.	"
Middle Time, true $\sigma$ 1748, July, 13	23	22	3	
Time of Reduction sub.		2	36	
Equal Time, true Ecliptic $\sigma$	13	23	19	27
Equation of one part of Time sub.		9	11	
Apparent Time at London	13	23	10	16
Mean Anomaly of $\begin{cases} \odot \\ \end{cases}$	0	25	14	8
	0	10	21	16
Place of the Sun and Moon	4	2	39	59
Moon's North Node	10	7	57	54
Argument of Latitude	5	24	42	5
True Latitude $\gg$ North Desc.			27	40
Reduction add			1	11
Hourly Motion of the $\begin{cases} \odot \\ \end{cases}$			2	23
			29	42
Hourly Motion of the $\gg a \odot$			27	19
Semidiameter of the Earth's Disk			52	32
Semidiameter of the Penumbra			30	54
Sum			83	26
Difference			21	38
Parallax of $\begin{cases} \text{Longitude} \gg a \odot \\ \text{Latitude} \gg a \odot \end{cases}$	13	15		
	25	41		
At one Hour before the true $\sigma$ , viz. 13	22	10	16	
Parallax of $\begin{cases} \text{Longitude} \gg a \odot \\ \text{Latitude} \gg a \odot \end{cases}$		21	18	
		24	48	
Interval of true and visible $\sigma$ sub.		41	16	
Visible $\sigma$ is 1748, July	13	22	29	0
Parallax of $\begin{cases} \text{Longitude} \gg a \odot \\ \text{Latitude} \gg a \odot \end{cases}$		18	50	
		24	59	
True Lat. $\gg$ N. D.		29	27	
Visible Latitude $\gg$ N. D.		4	28	
Semidiameters of $\begin{cases} \odot \\ \end{cases}$		16	2	
		14	52	
Sum		30	54	
Parts deficient		26	26	
Digits Eclipsed are		90	53	00
Scruples of Incidence		39	35	
At one Hour before visible $\sigma$ , viz. 13	21	29	0	
Parallax of $\begin{cases} \text{Longitude} \gg a \odot \\ \text{Latitude} \gg a \odot \end{cases}$		26	17	
		24	43	

R 2



	D.	h.	'	"
At one after the visible $\sigma$ , viz.	13	23	29	0
Parallax of { Longitude $\Delta a \odot$			10	37
{ Latitude $\Delta a \odot$			26	8
Time of Incidence sub.		1	32	22
Time of Repletion add		1	36	4
Motion from the visible $\sigma$ to greatest Darkness				22
Time from the visible $\sigma$ to greatest Darkn. add	1			9
Visible Lat. $\Delta$ at { Beginning	7	30		N. D.
{ End	0	48		S. A.

	D.	h.	'	"	
Here, the apparent Time at London of the { Beginning is 1748, July 13	20	57	47		} P.M.
{ Visible $\sigma$	22	29	0		
{ Greatest Obscuration	22	30	9		
{ End of the Eclipse	14	0	6	13	
Total Duration	3	8	26		

The Type.



This Eclipse will be very great at *London*, for more than  $\frac{1}{4}$  of the Sun's Diameter will be darkened on the North side, as *per* Type above. At the middle of the Eclipse, the Sun is vertical to the very end of the River Nile, in *Nigritia*, Latitude  $19^{\circ} \frac{1}{2}$  North, and Longitude  $23^{\circ}$  East from *London*.

In the next Place, I shall present the Reader with a Synopsis of the Calculation of the general Times of the Passage of the Penumbra over the Earth's Disk, during the time of this Solar Eclipse, under the Meridian of *London*.

Sun's

	0	1	"
Sun's Declination North	19	36	49
Angle of the ☽'s visible Way	5	45	0
First Angle of Incidence	70	38	0
Second	58	13	0
Inclination of the two Axes	13	12	0
Angle of Direction	18	57	0
Motion of $\frac{1}{2}$ Durat. of the General Eclipse	1	18	42
Motion of $\frac{2}{3}$ Duration of the Central		44	39
Motion $\alpha$ ☽'s Axis, to the nearest approach.			
Center		9	30
Time of half Duration	2h	52	52
Time of $\frac{2}{3}$ Duration of Central Eclipse	1	38	5
Time $\alpha$ ☽'s Axis to the Middle		20	32
Hence	D.	h.	' "
The Penumbra first touches ☽ Disk	13	20	22 36
The Center of the Penumbra enters ☽	21	37	23
Meridional Sun centrally Eclipsed	22	54	36
Sun Eclipsed in the Nonagesimal Degree	23	10	16
Middle, or Center Penumbra on Axis ☽ Orb	23	15	28
Cent. Penumbra passes off the ☽ Disk	14	0	53 33
Penumbra passes off the ☽ Disk	14	2	8 20
Total Duration		5	45 44

Likewise, I have also determined the Latitude and Longitude of those Places on the Globe where the principal Appearances of this Solar Eclipse happeneth, which take as followeth.

	Lat.	Long. à London
	0°	0
Sun begins Eclipsed	13	N 44=50 W 30 Atlant.
as he rises		
Sun rises Centrally E-	46	49=75 W 27 Quebec.
clipsed		
Centrally Eclipsed in	53	27=16 E 21 Dantzick.
the Meridian		
Centrally Eclipsed in	53	23= 8 E 22 Mons.
Nonagesimal		
Sun's lower is touched	81	40=16 E 21 beyond Pole.
by ☽'s upper Limb		



Lat. Long. à London.

Sun sets Centrally E- clipsed	} 12	5=80 E 59	<i>East-Indies.</i>
Eclipse ends at Sun setting			
Sun's upper is touched by D's lower, in Mer.	} 21	25=16 E 21	<i>Barbary</i>

*The Transit of the Shade of the Moon over the Earth  
in this Solar Eclipse.*

The central Shade enters on the Earth, in Latitude 46° North, about *Quebeck* in *Canada*, in *North America*, from whence it traverses *Hudson's-Bay*, leaving all the known Land to the Right, and passing by the North Pole, to Latitude 81°, which Place is its North Limit; from thence, passing over *Terra Incognita*, and *Great Tartary*, to the *East-Indies*, where the central Shade leaves the Earth; from thence, it passes over *Arabia Felix*, leaving *Egypt* to the Right, and passing on into the vast *Atlantic Ocean*, near *Cape Verde* Islands, leaving the *Caribbe-Isles*, *Porto Rico*, *Hispaniola*, *Jamaica*, and *Cuba*, a little to the West, the Limits of the Shade passes near *Boston* in *New-England*: so that the Eclipse will be visible in all *Europe*, in the Western Parts of *Asia*, in the Northern Parts of *Africa*, and in the North-East Parts of *America*.

The last Eclipse this Year, will be a partial and visible one, of the Moon, (if Clouds hinder not) on *Thursday*, the 28th Day of *July*, at 11 a Clock at Night; a Synopsis of the Calculation follows.

	D.	h.	'	"
Equal Time of the true ☉ 1748, <i>July</i> 28	11	47	2	
Equation of Time sub.			9	53
Apparent Time at <i>London</i> in Orb	28	11	37	9
Time of Reduction add			3	32
Apparent Time, true Ecliptic ☉	28	11	40	41
				Mean

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	D.	b.	1.	"
Mean Anomaly of $\left\{ \begin{array}{l} \odot \\ \text{D} \end{array} \right.$	1	9	32	38
	6	20	0	43
Place of the $\odot$ $\alpha$ $\ominus$	52	16	33	59
Place of the Moon in her Orb	10	16	33	59
Moon's North Node	10	7	11	27
Argument Latitude	0	9	22	32
True Latitude $\text{D}$ 's North Ascending			48	48
Reduction sub.			2	5
Hourly Motion of $\left\{ \begin{array}{l} \odot \\ \text{D} \end{array} \right.$			2	24
			37	50
Hourly Motion $\text{D}$ $\alpha$ $\odot$			35	26
Sum of the Horizontal Parallaxes			61	3
			16	3
Semidiameters of $\left\{ \begin{array}{l} \odot \\ \ominus \end{array} \right.$ Shadow			45	0
			16	37
Sum			61	37
Latitude $\text{D}$			48	48
Parts deficient			12	49
Digits Eclipsed are		40	38	00
Scruples of Incidence			37	37
Motion from the middle to the $\odot$			4	9
Time of Incidence sub. and add		1b	3	41
Time from the Middle to the $\odot$ sub.			7	2
Motion of the Sun in the Time of Incidence			2	33
Sum			40	10
Argument Latitude at $\left\{ \begin{array}{l} \text{Beginning} \\ \text{End} \end{array} \right.$	0	8	42	22
	0	10	2	42
			1	"
Lat. $\text{D}$ at $\left\{ \begin{array}{l} \text{Beginning} \\ \text{End} \end{array} \right.$	45	21	} N.A.	
	52	15		

Hence the ap- parent Time at London of the	{		<i>D.</i>	<i>h.</i>	<i>'</i>	<i>"</i>	} <i>P. M.</i>
		Beginning 1748, <i>July</i> 28	10	29	58		
		Midd. or greatest Darkn.	11	33	39		
		Eclipse ☿	11	40	41		
		End of the Eclipse	12	37	20		
		Total Duration	2	7	22		

## The Type.



This Eclipse will be seen in all *Europe*, except the North Parts of *Russia*, in all *Africa*, in part of *Asia*, and in the South Parts of *America*. At the middle of the Eclipse, the Moon is vertical in the *Ethiopian* Ocean,  $6^{\circ}$  to the West of *Cape Negro*, between that and *St. Helena*, Latitude  $15^{\circ} \frac{1}{2}$  South. The Moon rises in the middle of the Eclipse to *Cuba* and *Jamaica*, and to the North-West Parts of *America*, viz. in the Gulph of *St. Lawrence* and *Acadia*, near *Newfoundland*.

The Moon sets in the middle of the Eclipse, to the Eastern Parts of the *Mogul's Empire*, about *Gor*, and *Cotan* in *Tartary*, and in the Northern Parts of *Muscovia* or *Russia*; with which I conclude the Eclipses for the Year 1748.

*Of the ECLIPSES of the Sun and Moon that will happen in the Year 1749.*

There will be five, three of the Sun, and two of the Moon, only one of each Luminary visible at *London*; they happen as follows.

The first is of the Sun, on *Saturday, January 7th*, at 7 at Night, invisible as follows.

	D.	b.	'	"
Equal Time, true $\sigma$ 1749, <i>January</i>	7	7	16	39
Equation of Time sub.			11	23
			Apparent	



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	D.	h.	'	"
Apparent Time at <i>London</i>	7	7	5	16
Mean Anomaly of $\left\{ \begin{array}{l} \odot \\ \text{D} \end{array} \right.$	6	29	0	43
Place of the $\odot$ $\alpha$ $\ominus$ and $\text{D}$ in her Orb	9	28	57	29
Moon's Node	9	28	34	2
Argument Latitude	0	0	23	27
True Latitude $\text{D}$ North Ascending			2	2
Semidiameter of the $\ominus$ Disk			60	14
Semidiameter of the Penumbra			33	8
Sum			93	22
Difference			27	6

Here, the Moon's true Latitude being less than the Difference, shews that the Eclipse will be both Total and Central, and that all the Penumbra will fall within the Disk. The Sun will then be vertical to the *Pacific* Ocean, in  $20^\circ$  South Latitude, and  $104^\circ$  West Longitude from *London*. The Eclipse will be very great and visible in *America*, viz. at *New Spain*, *Terra Firma*, *Jamaica*, *Cuba*, and Places adjacent.

The Second is a Lunar Defect, invisible at *London*, on *Monday, June 19th* in the Morning; a Synopsis of the Calculation follows.

	D.	h.	'	"
Equal Time of the true $\odot$ 1749, <i>June</i> 18	21	12	49	
Equation of Time sub.		2	59	
Apparent Time Orbit $\odot$	18	21	9	50
Time of Reduction sub.		4	26	
Apparent Ecliptic $\odot$	18	21	5	24
Mean Anomaly of $\left\{ \begin{array}{l} \odot \\ \text{D} \end{array} \right.$	0	0	15	7
Place of the $\odot$ $\alpha$ $\ominus$	4	11	15	54
Place of the $\text{D}$ in her Orbit	9	8	30	42
Moon's North Node	9	19	57	11
Argument Latitude	11	18	33	31
True Latitude $\text{D}$ South Descending			59	26
Reduction add			2	31
Hourly Motion of $\left\{ \begin{array}{l} \odot \\ \text{D} \end{array} \right.$			2	23
			26	24

S

Hourly

Hourly Motion of $\text{D}$ $\alpha$ $\odot$	34	1		
Sum of the Horizontal Parallaxes.	59	43		
Semidiameters of $\left\{ \begin{array}{l} \odot \\ \ominus \text{ Shadow} \end{array} \right.$	16	0		
	43	43		
	16	2		
Sum	60	4		
Latitude $\text{D}$	59	26		
Parts deficient	0	38		
Digits Eclipsed are	13	55		
Scruples of Incidence	8	42		
Motion from $\text{D}$ to the Middle	5	4		
Time of Incidence, sub. and add	15	21		
Time from $\text{D}$ to the Middle add	8	57		
Motion $\odot$ in time of Incidence		36		
Sum	9	18		
Argument of Lat. at $\left\{ \begin{array}{l} \text{Beginning} \\ \text{End} \end{array} \right.$	11 18 24 13	11 18 42 49		
Lat. $\text{D}$ at $\left\{ \begin{array}{l} \text{Beginning} \\ \text{End} \end{array} \right.$	1 0 14 } S. D.	0 58 39 }		
Hence the ap- parent Time at London of the	<i>D.</i>	<i>b.</i>	<i>'</i>	<i>"</i>
$\left\{ \begin{array}{l} \text{Beginning 1749, June} \\ \text{Ecliptic } \odot \\ \text{Middle, or greatest Darknefs} \\ \text{End} \\ \text{Total Duration} \end{array} \right.$	18 20 59 0	21 5 24	21 14 21	21 29 42
			30	42

The Type.



This Eclipse is so very small, that it is scarce worth my Time and Ink to write upon it. The Moon is vertical at the middle of the Eclipse; in *Mar del Zur*, Latitude  $23^{\circ}$  South, and Longitude from London  $140^{\circ}$  West.



West. It will be seen in the Western Parts of *America*, in the vast Ocean, bounding *America* and *Asia*, and in *Terra de Papos*, that is, the most Eastern known Parts of *Asia*.

The Third is a Solar Eclipse, on *Monday, July 3d*, near Noon, but invisible at *London*, as I thus prove.

	D.	h.	'	"
Equal Time of the true $\sigma$ 1749, <i>July</i>	3	0	31	9
Equation of Time sub.			5	12
Apparent Time	3	0	25	57
Time of Reduction add			1	23
Apparent Ecliptic $\sigma$	3	0	27	20
Mean Anomaly of $\left\{ \begin{array}{l} \odot \\ \oslash \end{array} \right.$	0	14	11	7
	10	15	58	58
Hourly Motion of $\oslash$ a $\odot$			28	15
Place of the Sun and Moon	3	21	59	0
North Node Moon	9	19	11	56
Argument Latitude	6	2	47	4
True Latitude Moon S. A.			14	33
Reduction sub.				39
Parallax of $\left\{ \begin{array}{l} \text{Longitude } \oslash \text{ a } \odot \\ \text{Latitude } \oslash \text{ a } \odot \end{array} \right.$			27	1
Semidiameter of $\left\{ \begin{array}{l} \text{Earth's Disk} \\ \text{Penumbra} \end{array} \right.$			53	20
			31	5
Sum			48	25
Difference			22	15

By this Parallax of Latitude, at the true  $\sigma$ , I see that the visible Latitude, at the visible  $\sigma$ , will far exceed the Sum of the Semidiameters of the Luminaries, so that the Shade of the Moon will not then reach so far as the Parallel of *London*, but in the more Southern Parts of the Globe it will be a great Eclipse, for all the Penumbra doth then all fall within the Disk: it will be Central and Annular, for the Sun's Semidiameter exceeds the Moon's by 57". The Sun is then vertical to *St. Anthony's River*, on the Western Coasts of *Barbary*, Latitude 21° North, Longitude 8° West to *London*. It will be seen in *Guinea*, and very great at *St. Helena*.

The Fourth is of the Moon, and visible at *London*, if the Air be clear, on *Tuesday, December 12th*, in the Evening, according to the following Calculation.

	D.	h.	'	"
Equal Time of the true ☉ 1749, Dec. 12	8	4	49	
Time of Reduction sub.			3	40
Middle Time, Ecliptic ☉	12	8	1	9
First part of Equation of Time sub.				49
Apparent Time	12	8	0	20
Mean Anomaly of ☉	5	24	9	46
☾	9	6	36	56
Place of the ☉ a ☉	9	2	14	13
Place of the ☾ in her Orbit	3	2	14	13
Moon's North Node	9	10	36	55
Argument Latitude	5	21	37	18
True Latitude ☾ N. D.			43	39
Reduction add			2	31
Hourly Motion of the ☾ a ☉			30	29
Sum of the Horizontal Parallaxes			56	29
Semidiameters of ☉			16	30
☉ Shadow			39	59
☾			15	37
Sum			55	36
Latitude ☾			43	39
Parts deficient			11	57
Digits eclipsed are	40		35	30
Scruples of Incidence			34	26
Motion from ☉ to the Middle			3	43
Time of Incidence sub. and add	1h		7	48
Time from ☉ to the Middle			7	19
Motion of the ☉ in the time of Incidence			2	53
Sum			37	19
Argument Lat. at ☉ Beginning	5	20	59	59
☾ End	5	22	14	37
			1	"
Lat. ☾ at ☉ Beginning	46	53		
☾ End	40	26		
				N. D.

Hence,

	D.	h.	'	"
Hence, the ap- parent Time at London of the	Beginning 1749, December 12	6	59	51
{	Ecliptic &	8	0	20
	Middle, or greatest Darknes	8	7	39
	End of the Eclipse	9	15	27
	Total Duration	2	15	36

The Type.



This Eclipse will be seen in *Europe, Africa*, in almost all *Asia*, and in the North-East Parts of *America*; the Moon is vertical at the middle of the Eclipse, to the most Eastern Parts of *Turkey* in *Asia*, at the Entrance of the *Persian Gulph*, Latitude  $23^{\circ}$  North, Longitude  $58^{\circ}$  East from *London*.

The Moon rises Eclipsed to the North-East Parts of *New England*, and in the Gulph of *St. Lawrence*, in *North America*; and sets in the middle of the Eclipse, at *Terra de Papos*, the most Easterly known Parts of the *East-Indies*.

The Fifth and last Eclipse this Year, is of the Sun, visible at *London*, (if the Air be serene) on *Thursday*, the 28th of *December*, in the Morning, as follows.

	D.	h.	'	"
Middle Time of the true & 1749, Dec. 27	21	42	47	
Time of Reduction add			3	21
Equal Time, true Ecliptic &	27	21	46	8
Equation of Time sub.			6	5
Apparent Time Ecliptic &	27	21	40	3
Mean Anomaly of { ☉	6	9	30	25
{ ☾	4	0	1	12
Place of the Sun and Moon	9	18	6	53
Moon's Node	9	9	47	7
Argument Latitude	0	8	19	46
				True



True Latitude $\gg$ N. A.	43	24	
Reduction sub.	1	51	
Hourly Motion of $\gg a \odot$	33	8	
Semidiameter of the Earth's Disk	58	0	
Semidiameter of the Penumbra	32	43	
Sum	90	43	
Difference	25	17	
Parallax of $\left\{ \begin{array}{l} \text{Longitude } \gg a \odot \\ \text{Latitude } \gg a \odot \end{array} \right.$	13	22	
At one Hour before the true $\sigma$	27	20	40 3
Parallax of $\left\{ \begin{array}{l} \text{Longitude } \gg a \odot \\ \text{Latitude } \gg a \odot \end{array} \right.$	20	35	
Visible hourly Motion of $\gg a \odot$	54	1	
Time from true $\sigma$ to the visible sub.	25	53	
Visible $\sigma$ is 1749, <i>December</i>	30	59	
Parallax of $\left\{ \begin{array}{l} \text{Longitude } \gg a \odot \\ \text{Latitude } \gg a \odot \end{array} \right.$	27	21	9 4
Visible Latitude $\gg$ South Desc.	17	17	
Parts deficient	54	52	
Digits Eclipsed are	13	4	
Scruples of Incidence	19	39	
Motion from visible $\sigma$ , to greatest Obscuration	7 <sup>o</sup>	8	43
Time from visible $\sigma$ , to greatest Obscurat. add	30	0	
Time of Incidence sub.	1	7	18
Time of Repletion add	1	11	7
Lat. $\gg$ seen at $\left\{ \begin{array}{l} \text{Beginning} \\ \text{End} \end{array} \right.$	13	45	$\left. \begin{array}{l} \\ \end{array} \right\}$ S. D.
	11	22	

	<i>D.</i>	<i>h.</i>	<i>'</i>	<i>"</i>
Hence, the apparent Time at <i>London</i> of the $\left\{ \begin{array}{l} \text{Beginning 1749, December 27} \\ \text{Visible } \sigma \\ \text{Greatest Obscuration} \\ \text{End of the Eclipse} \\ \text{Total Duration} \end{array} \right.$	27	20	4	25
		21	9	4
		21	11	43
		22	22	50
		2	18	25

This Eclipse will (if the Air be clear) be well worth  
*the Learned Astronomers* time to observe it at *London*,  
*which* will appear as the following Type sheweth.

The

The Type.



At the time of the middle of the Eclipse, the Sun is vertical to the South-West Part of *Madagascar*. The general Times of this Eclipse, are as follow.

Declination of the ☉ South	22	16	0
Angle of the ☾'s visible Way	5	37	0
First Angle of Incidence	61	25	0
The Second	41	34	0
Inclination of the two Axes	7	43	0
Angle of Direction	13	20	0
Motion of half Duration	1	19	40
Motion of half Duration of Central		39	29
Motion from the Perpendicular to ☾'s Axis		10	17
Time of half Duration	2	24	16
The Time of $\frac{1}{2}$ Central	1	9	41
Time from Middle to ☉'s Axis add		18	37

Hence

	D.	h.	'	"
The	Penumbra first touches 1749 } December			
		27	19	9
	Cent. Penumbra touches ☉'s Disk			
		20	23	40
	Middle, Center, Penumbra on } Axis ☾'s Orb			
		21	33	21
	Eclipsed in the Nonagesimal Deg.			
		21	40	3
	Eclipsed in the Meridian			
		21	51	58
	Cent. Penumbra passes off the Disk			
		22	43	2
It wholly leaves the ☉'s Disk				
		23	57	37
Total Duration				
		4	48	32

And



And I have likewise determined the particular Places on the Globe where

	Lat.	Long.
Sun begins E- clipsed as he rises	14	5 S 23 W 10 <i>Ethiopia.</i>
Centrally E- clipsed as he rises	32	9 S 50 W 50 <i>St. Domingo.</i>
Centrally E- clipsed in No- nagefimal	25	59 N 14 E 53 <i>Barbary.</i>
Centrally E- clipsed in Meridian	28	4 N 32 E 1 <i>Red-Sea.</i>
Sun's lower Limb touched	87	11 N 32 E 1 <i>N. of Greenland.</i>
Sun's upper Limb touched	10	27 S 32 E 1 <i>Zimbas.</i>
Sun sets Centrally Eclipsed	54	37 S 144 E 27 <i>South-Sea.</i>
Eclipse ends at Sun setting	38	11 S 109 E 23 <i>Holland. Nova.</i>

*The Transit of the Shade of the Moon over the Earth in this Solar Eclipse.*

The central Shade enters on the Earth, in Latitude of  $30^{\circ} 9'$  South, about *St. Domingo*, in the Country of *Paraguay*, in South America, from whence it traverses *Brazil*, and the vast *Atlantic Ocean*, including *Africa* and *Europe* to the East, and passing on within the Arctic Circle, to the Latitude  $87^{\circ} 11'$ , where the Sun's lower is touched by the Moon's upper Limb, in the Meridian; from thence, it passes through the East Part of *Tartary*, leaving *Mare Japonicum* to the East, and passing by the *Philippine Islands*, through *Terra de Papos*, and *Van Diemen's Land*, into the unknown

unknown Southern Ocean, to Latitude  $54^{\circ} 37'$ , from thence it passes the *Oceanus Orientalis*, including the Island of *Madagascar*, passing over *Cafraria*, leaving the *Cape of Good Hope* to the South, and so on through the *Atlantic Ocean*, to *St. Domingo* again, where the rising Sun will be seen centrally Eclipsed. This Eclipse where Central, (which is about *Terra de Natal*, on the Eastern Coast of the Country of *Cafraria*, in the South Part of *Africa*) will be Annular, or a small Ring of Light round the Moon. The Breadth of the Shade from North to South is 5858, and the Length from East to West 11717 *English Miles*. If, on the Terrestrial Globe, you draw a Path with Chalk to the Places abovementioned; you may plainly see what places fall within the Shade, and what do not. And here I am come to a conclusion of my intended Task, which I shall conclude with the Words of the wise Man, Ecclesiast. 7. 8. *Better is the End of a thing, than the Beginning.* In this I hope the skilful Astronomer, Navigator, and Geographer will find that which will be a help to rectify the Maps and Charts in the Longitude of Places.

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*The Times of the Transit of the Planets, Venus and Mercury, over the Sun's Disk, with a Synopsis of the Calculations; from Anno 1720, to Anno 1799, inclusive: under the Meridian of London.*

THIS Excellent Part of Astronomy that I am here going to treat of, was wholly unknown to the Astronomers of ancient Times, the first that ever made this Discovery, was the famous Mr. *Jeremy Horrox*, who in the Year 1639, November 24<sup>d</sup> 3<sup>h</sup> 15<sup>i</sup> P.M. observed the Planet *Venus* in the Sun's Disk, the Longitude of the Sun (according to *Astronomia Carolina*, from whence I have deduced the following

Calculations) was then  $\nearrow 12^{\circ} 22' 30''$  of *Venus*,  $\nearrow 12^{\circ} 33' 35''$  with Lat.  $10' 30''$  South.

The Ice being now broke, gave way for others to observe the like Appearances; and in the Year 1661, April 25d 5h P. M. the Planet *Mercury* was seen in the Sun by *John Hevelius*, at *Dantzick*. By this time the Eyes of most of the Astronomers in *Europe* began to be open, and amongst the rest, our Countryman Mr. *Thomas Street* began to take notice of these rare Phenomena; and next unto him, the incomparable Dr. *Edmund Halley*, who has given us a Series of the Times in which *Venus* and *Mercury* will be seen in the Sun's Discus, for the last past, and present Age; and in *Philosophical Transactions*, N<sup>o</sup>. 548. he has given us a large Scheme of *Venus* in the Sun, Anno 1761, May 26th, in the Morning; a particular Account of the Time and Transit you will find in its proper Place in the following Sheets. Also in his Catalogue of the Southern Stars observed at *St. Helena*, in the Year 1677, he observed *Mercury* in the Sun's Disk, on October 28th, in the Forenoon; to which I refer the inquisitive Reader.

Lastly, I have in my Treatise of Eclipses given you an account of the Planets *Venus* and *Mercury* being seen in the Sun for this Century, from the time of the Publication of that Book; and two Transits of *Mercury* over the  $\odot$ 's Disk, in this Century, before that Book was writ, happened thus.

Anno 1707, April 24th, at Midnight,  $\P$  passed over the Sun; and

Anno 1710, October 26th, near Midnight, the same Planet also passed over the Sun. In the former of these, his Latitude was not  $\frac{1}{2}$  North, and in the latter, about the same South Latitude, Anno 1720, April 26d 21h 25' 19" P. M. *Mercury* was conjoined with the Sun, but then had  $17' 12''$  of South Latitude, which exceeds the Sun's Semidiameter thereby  $1' 27''$ , proves he could not be seen then in the Sun, though very near his Periphery: and, because these three are past, I shall also pass by the Calculation of them.

Anno



Anno 1723, October 29th, Mercury will tranfit the Sun's Disk; a Synopsis of the Calculation follows.

	D.	h.	'	"
Equal Time true $\odot$ at London, } 1723, October	29	6	17	25
Equation of Time add			16	2
Apparent Time true $\odot$	29	6	33	27
Mean Anomaly of $\odot$	4	10	43	52
Mean Anomaly of $\oslash$	5	12	33	41
True Distance of $\odot$ a $\ominus$ 98887	4	995	141	
True Distance of $\oslash$ a $\odot$ 31406	4	497	019	
True Distance of $\oslash$ a $\ominus$ 67481				
Geocentric $\odot$ Long. of $\odot$ and $\oslash$ R $\odot$	7	16	46	36
Latitude N. A.			6	16
Anomaly of Commutation	6	0	0	0
Inclination, or Heliocentric Latitude			13	26
Elongation to 6 Hours before $\odot$			35	21
Difference of Latitude in 6 Hours			5	12
The Angle of the visible Way	8 $^{\circ}$	22		5
The nearest Approach of their Centers		6	12	
The Motion from middle to true $\odot$			54	
The true Latitude of $\oslash$ at the Middle		6	8	
The Motion of half the visible Way		14	51 $\frac{1}{2}$	
The Motion of half Duration		14	42	
Difference Latitude between Middle, Beg. } and End 129".7		2	9.7	
$\oslash$ true Lat. a $\ominus$ { When he first touches		3	58	
{ When he goes off the Sun		8	17.7	
Time from true $\odot$ to the Middle sub.		9	10	
Time of half Duration sub. and add	2h	29	42	
The Arch of $\odot$ 's Perimeter, from Ecliptic first touch		14	35	0
The Arch, $\odot$ 's Perimeter, from Ecliptic when he goes off $\odot$		31	1	0
Apparent Semidiameter $\oslash$ 4" of $\odot$		16	6	

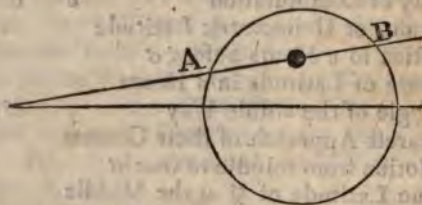
		D. h. ' "			
Hence, the apparent Time at London of the	Central Ingress, 1723, } October A	29	3	54	35
	Middle of the Eclipse		6	24	17
	True Conjunction		6	33	27
	Central Egress, or End, B	8	53	59	
	Total Duration	4	59	24	

P.M.

☉ Declination  $16^{\circ} 57' S.$ ☉ A. D.  $22 \ 33 = 1h \ 30' \ 12''$ 

☉ sets at  $4h \ 29' \ 48''$ , so that ☿ touches the Sun  $35' \ 13''$  before ☉ sets at London; and ☿ is then a little to the Left above.

The Type.



Anno 1730, Sol and Mercury are conjoined in  $m$ .  $10^{\circ} c' 46''$ , October 22d  $5h \ 42' \ 45''$  P.M. Sun's Semi-diameter  $16' 5''$ , and ☿ Latitude  $17' 4''$  South; this proves it cannot be seen on the Sun's Disk then.

Anno 1736, the Planet Mercury will appear on the upper Part of the Sun's Disk, on the last Day of October; a Synopsis of the Calculation followeth.

		D. h. ' "			
Equal Time of the true ☿ at London, } 1736, October		31	0	8	42
Equation of Time add				15	44
Apparent Time of the true ☿		31	0	24	36
Mean Anomaly of ☉		4	13	6	49
	☿	5	14	31	33
True					

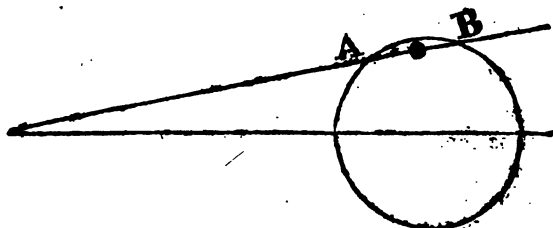


	<i>D. h. ' "</i>			
True Distance of	$\odot a \ominus$	98833	4.994901	
	$\oslash a \odot$	31192	4.494040	
	$\oslash a \ominus$	67641	4.830210	
Geocentric	{ Long. of $\odot$ and $\oslash R.$		7 19 23	16
	{ Latitude $\oslash$ N. A.			14 17
Anomaly of Commutation		6 0 0	0	
Inclination, or Heliocentric Latitude			30	58
Elongation to 6 Hours before the true $\oslash$			35	27
Difference of Latitude in 6 Hours			5	4
Angle of the visible Way over the $\odot$		8 8 0		
The nearest approach of their Centers		14	8	
Motion from the middle to true $\oslash$		2	0	
True Latitude of $\oslash$ at the middle N. A.		13	59	
Motion of half the visible Way over the $\odot$		7	42	
Motion of half Duration		7	38	
Difference, Latitude, between Middle, Beginning and End, sub. and add	{		1	5
	{			
$\oslash$ true Lat. $a \ominus$	{ When he first touches the $\odot$		12	54
	{ When he goes off the Sun		15	4
Time from the Middle to the true $\oslash$ sub.		20	18	
Time of half Duration sub. and add		1	17	31
Arch of the $\odot$ 's Perim. when $\oslash$ touches		53	15	0
Arch of the $\odot$ 's Perim. when he goes off		69	21	0
Apparent Semidiameter $\oslash$ 4" of $\odot$			16	6

	<i>D. h. ' "</i>			
Hence, the apparent Time at London of the	{ Central Ingress, is,		30 22 46	37
	{ 1736, October A			
	{ Middle of the Eclipse		31 0 4	8
	{ True Conjunction		0 24 26	
	{ Central Egress, or End, B		1 21 39	
	{ Total Duration		2 35 2	

The

## The Type.



Anno 1740, April 21st, in the Western Parts of America, the Planet Mercury may be seen to pass over the Sun, but at London invisible; a Synopsis of the Calculation stands thus.

	D.	h.	'	"
Equal Time of the true $\sigma$ at London, } 1740, April	21	12	14	6
Equation of Time add			3	19
Apparent Time of the true $\sigma$	21	12	17	25
Mean Anomaly of $\left\{ \begin{array}{l} \odot \\ \oslash \end{array} \right.$	10	3	21	50
	10	15	40	0
True Distance of $\left\{ \begin{array}{l} \odot \text{ } \sigma \text{ } \odot \\ \oslash \text{ } \sigma \text{ } \odot \\ \oslash \text{ } \sigma \text{ } \ominus \end{array} \right.$	100973	5.004205		
	41964	4.653833		
	55909	4.747481		
Geocentric $\left\{ \begin{array}{l} \text{Long. } \odot \text{ and } \oslash \text{ Rz.} \\ \text{Latitude } \oslash \text{ N. D.} \end{array} \right.$	8	12	47	34
			13	50
Anomaly of Commutation	6	0	0	0
Inclination, or Heliocentric Latitude N. D.			17	10
Elongation to 6 Hours before $\sigma$			23	34
Difference of Latitude to 6 Hours before $\sigma$			4	13
Angle of the visible Way		10	8	39
Nearest approach of their Centers			13	37
Motion from the true $\sigma$ , to the Middle			2	24
Latitude of $\oslash$ at the Middle N. D.			13	24
Motion of half the visible Way			7	57
Motion of half Duration			7	49
Difference Latitude, between Begin. Middle, } and End			1	24
			$\oslash$ true	

☿ true Lat.  $\alpha$   $\ominus$   $\left\{ \begin{array}{l} \text{When he first touches } \odot \\ \text{N. D.} \end{array} \right\} 14 \quad 48$   
 $\left\{ \begin{array}{l} \text{When he goes off the } \odot \\ \text{N. D.} \end{array} \right\} 12 \quad 0$

Time from the true  $\sigma$ , to the Middle add 36 40

Time of half Duration sub. and add 1h 59 32

Arch of the  $\odot$ 's Periphery when ☿ first touches  $\left\{ 69^\circ \quad 52 \quad 0 \right.$

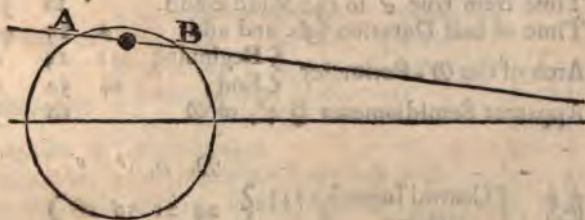
Arch of the  $\odot$ 's Periphery when ☿ goes off 42 35 0

Apparent Semidiameter ☿ 6", and of the  $\odot$  15 46

*D. h. ' "*

Hence, the apparent Time at London of the  $\left\{ \begin{array}{l} \text{Central Ingress, 1740, } \\ \text{April A} \end{array} \right\} 21 \quad 10 \quad 54 \quad 33$   
 $\left\{ \begin{array}{l} \text{True Conjunction} \\ \text{Middle of the Eclipse} \\ \text{Central Egress, or End B} \end{array} \right\} \begin{array}{l} 12 \quad 17 \quad 25 \\ 12 \quad 54 \quad 5 \\ 14 \quad 53 \quad 37 \end{array} \text{ P.M.}$   
 Total Duration 3 59 4

The Type.



Anno 1743, October 25th, will be a visible Transit of Mercury over the Sun, and visible at London by the help of a good Telescope; the Requisites of the Calculation stand thus.

*D. h. ' "*

Equal Time of the true  $\sigma$  at London,  $\left\{ 24 \quad 23 \quad 45 \quad 0 \right.$   
 1743, October

Equation of Time add 15 18

Apparent Time of the true  $\sigma$  25 0 1 18  
 Mean

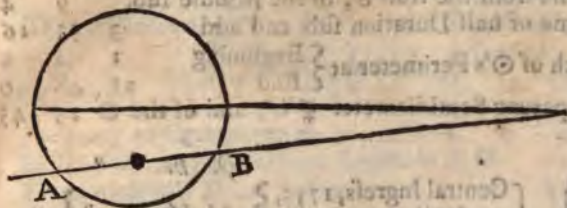
	<i>D.</i>	<i>h.</i>	<i>'</i>	<i>"</i>
Mean Anomaly of $\left\{ \begin{array}{l} \odot \\ \oslash \end{array} \right.$	4	6	24	13
	5	9	54	37
The Distance of $\left\{ \begin{array}{l} \odot a \ominus \\ \oslash a \odot \\ \oslash a \ominus \end{array} \right.$	98992	4.995600		
	31493	4.498217		
	67499	4.829297		
Geocentric $\left\{ \begin{array}{l} \text{Long. } \odot \text{ and } \oslash \text{ R.} \\ \text{Latitude S. D.} \end{array} \right.$	$11^{\circ}$	12	37	24
			8	45
Anomaly of Commutation	6	0	0	0
Inclination, or Heliocentric Latitude			18	44
Elongation to 6 Hours			35	4
Difference of Latitude in 6 Hours			5	7
Angle of the visible Way		8°	18	5
Nearest Approach of their Centers			8	39
Motion from the true $\sigma$ , to the Middle add			1	15
True Latitude of $\oslash$ at the Middle S. D.			8	38
Motion of half the visible Way			13	33
Motion of half Duration			13	24
Difference of Latitude, between Middle, Beginning and End			1	57
$\oslash$ Lat. $\left\{ \begin{array}{l} \text{at the Beginning S. D.} \\ \text{at the End S. D.} \end{array} \right.$			10	36
			6	41
Time from true $\sigma$ to the Middle add			12	50
Time of half Duration sub. and add		2	17	40
Arch of the $\odot$ 's Perimeter $\left\{ \begin{array}{l} \text{Beginning} \\ \text{End} \end{array} \right.$	41	14	0	
	24	34	0	
Apparent Semidiameter $\oslash$ 4", of $\odot$		16	5	

	<i>D.</i>	<i>h.</i>	<i>'</i>	<i>"</i>
Hence, the apparent Time at London of the $\left\{ \begin{array}{l} \text{Central Ingress, 1743, } \\ \text{October A} \end{array} \right.$	24	21	56	28
True Conjunction	25	0	1	18
Middle of the Eclipse		0	14	8
Central Egress, End B	2	31	48	
Total Duration	4	35	20	

The



The Type.



Anno 1753, on Sunday, April 25th, in the Morning, Mercury will be seen to make a black Spot in the Sun's Body, according to the following Calculation.

	D.	h.	'	"
Equal Time of the true $\sigma$ 1753, April 24	20	42	50	
Equation of Time add			3	37
Apparent Time of the true $\sigma$	20	46	27	
Mean Anomaly $\left\{ \begin{array}{l} \odot \\ \oslash \end{array} \right.$	10	6	20	50
	10	19	47	30
Distance of $\left\{ \begin{array}{l} \odot a \ominus \\ \oslash a \odot \\ \oslash a \ominus \end{array} \right.$	101046	5.004518		
	45348	4.656557		
	55698	4.745839		
Geocentric $\left\{ \begin{array}{l} \text{Long. } \odot \text{ and } \oslash \text{ R.} \\ \text{Latitude S. A.} \end{array} \right.$	8	15	53	22
			3	19
Anomaly of Commutation	6	0	0	0
Inclination, or Heliocentric Latitude S. A.			4	3
Elongation to 6 Hours before the true $\sigma$	23	24		
Difference of Latitude in 6 Hours			4	18
Angle of the visible Way	10	24	45	
Nearest Approach of their Centers			3	15
Motion from the Middle, to the true $\sigma$				35
True Latitude of $\oslash$ at the Middle			3	4
Motion of half the visible Way	15	24		
Motion of half Duration	15	9		
Difference Latitude, between Middle, Beginning and End, sub. and add			2	47
U				Lat.



Lat. $\varphi$ seen at $\ominus$	{ Beginning S. A.	0	17
	{ End S. A.	5	51
Time from the true $\sigma$ , to the Middle sub.		9	4
Time of half Duration sub. and add		3	53
		16	
Arch of $\odot$ 's Perimeter at { Beginning		1	2
	{ End	21	48
		0	
Apparent Semidiameter $\varphi$ 6", and of the $\odot$		15	45

	<i>D. h. m. s.</i>	
Hence, the apparent Time at London of the { Central Ingress, 1753, } 24 16 44 7		
	<i>April</i>	
	Middle of the Eclipse	20 37 23
	True Conjunction	20 46 27
	Central Egress, or End	25 0 30 39
	Total Duration	7 46 32
		P.M.

$\odot$  rises at London that Morning at 4<sup>h</sup> 31' 40", and the Eclipse begins after the  $\odot$  is up 12' 27".

### The Type.



Anno 1756, on Sunday, October 27th, in the Morning, Mercury will Transite the Sun's Disk, and will be part visible at London, as follows.

	<i>D. h. m. s.</i>	
Equal Time true $\sigma$ at London, 1756, } 26 17 42 42		
<i>October</i>		
Equation of Time add		16 11
Apparent Time true $\sigma$	26 17 58 53	
		Mean

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		D.	h.	'	"
Mean Anomaly of $\odot$		4	8	47	26
	$\oslash$	5	11	33	34
True Distance of $\odot$ a $\ominus$	98933	4.995343			
	$\oslash$ a $\odot$	31378	4.496629		
	$\oslash$ a $\ominus$	67555	4.829657		
Geocentric	{ Long. $\odot$ and $\oslash$ R.	11	15	13	59
	{ Latitude $\oslash$ S. D.				55
Anomaly of Commutation		6	0	0	0
Inclination, or Heliocentric Latitude S. D.			1	3	
Elongation to 6 Hours before $\oslash$			55	16	
Difference of Latitude in 6 Hours			4	42	
Angle of the visible Way over $\odot$			8°	16	34
Nearest Approach of their Centers					54
Motion from the true $\oslash$ , to the Middle					8
True Latitude of $\oslash$ at the Middle S. D.					53
Motion of half the visible Way			16	3	
Motion of half Duration			15	53	
Difference of Latitude, between Middle, Beginning and End			2	18	
$\oslash$ Lat. seen a $\ominus$ at	{ Beginning S. D.		3	11	
	{ End N. A.		1	25	
Time from the true $\oslash$ , to the Middle add			1	20	
Time of half Duration sub. and add			2	42	23
Arch of $\odot$ 's Perimeter at	{ Beginning S.	11	28	0	
	{ End North	5	6	0	
Apparent Semidiameter $\oslash$ 4", and of $\odot$			16	5	

		D.	h.	'	"
Hence, the apparent Time at London of the	{ Central Ingress, 1758, } <i>October</i> A	26	15	17	50
	{ True Conjunction	17	58	55	
	{ Middle of the Eclipse	18	0	13	
	{ Central Egress, or End B	20	42	36	
	{ Total Duration	5	24	46	

At London,  $\odot$  rises that Morning at 7h 27' 16", so  $\oslash$  continues upon the  $\odot$  1h 15' 20" after he is risen.

## The Type.



Anno 1761, on Saturday, May 26th, in the Morning, the glorious Planet *Venus* will pass over the Sun, and be visible at *London*, (if the Air favour us) as follows.

	D.	b.	'	"
Equal Time of the true $\odot$ at <i>London</i> , } 1761, May	25	22	57	15
Equation of Time add			1	52
Apparent Time at <i>London</i> of the $\odot$	25	22	59	7
Mean Anomaly of $\odot$	11	6	56	47
Mean Anomaly of $\oslash$	10	10	25	23
True Distance of $\odot$ a $\ominus$	101698	5.006885		
True Distance of $\oslash$ a $\odot$	72670	4.861357		
True Distance of $\oslash$ a $\ominus$	20028	4.462817		
Geocentric } Long. $\odot$ and $\oslash$ R $\gamma$	II	15	46	50
Geocentric } Latitude $\oslash$ S. A.			6	41
Anomaly of Commutation	6	0	0	0
Inclination, or Heliocentric Latitude S. A.			2	46
Elongation to 6 Hours			23	35
Difference of Latitude to 6 Hours			3	46
Angle of the visible Way	8°	33	54	
Nearest Approach of their Centers			6	37
Motion from the Middle, to the true $\odot$				59
True Latitude of $\oslash$ at the Middle			6	33
Motion of half the visible Way			14	11
Motion of half Duration			14	2
Difference of Latitude, between Beginning, } Middle and End			2	7
			$\oslash$ Lat.	



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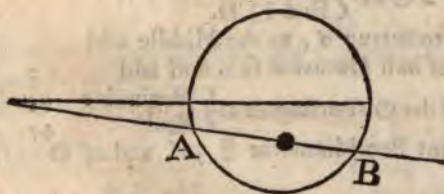
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♀ Lat. $\alpha$ $\ominus$ {	Beginning S. A.	4	26
	End S. A.	8	40
Time from the true $\phi$ , to the Middle sub.		15	2
Time of half Duration sub. and add		3	33 48
Arch of $\odot$ 's Perimeter at {	Beginning	16	27 0
	End	33	35 0
Apparent Semidiameter ♀ 36", and of $\odot$		15	40

D. h. ' "

Hence, the apparent Time at London of the	{ Central Ingress, 1761, }	25	19	10	17	} P.M.
	May A					
	{ Middle of the Eclipse	22	44	5		
	{ True Conjunction	22	59	7		
	{ Central Egrefs, or End B	26	2	17	53	
	{ Total Duration	7	7	36		

The Type.



Anno 1769, on Sunday, May 24th, (in the Morning,) the glorious Planet *Venus* will be seen under the Meridian of the *Philippine* Isles, and Eastern Parts of *China*, to pass over the Sun's Disk; but in respect to the Meridian of *London*, is part invisible, and happens as followeth.

D. h. ' "

Equal Time of the true $\phi$ 1769, May 23	15	39	0
Equation of Time add		2	14
Apparent Time at London	23	15	41 14
Mean Anomaly of { $\odot$	11	4	37 43
	10	8	9 10
			True

		D. h. ' "	
True Distance of	$\odot a \ominus$	101570	5.006767
	$\ominus a \odot$	72654	4.861263
	$\ominus a \ominus$	28916	4.461138
Geocentric	Long. $\odot$ and $\ominus R$	$\Pi$ 13	38 28
	Latitude $\ominus$ N. D.		13 9
Anomaly of Commutation		6 0	0 0
Inclination, or Heliocentric Latitude N. D.			5 15
Elongation to 6 Hours before $\sigma$			23 39
Difference of Latitude to 6 Hours			3 32
Angle of the visible Way over the $\odot$		8° 29	50
Nearest Approach of their Centers			13 0
Motion from the Middle, to the true $\sigma$			1 55
Latitude of <i>Venus</i> at the Middle			12 51
Motion of half the visible Way			8 44
Motion of half Duration			8 38
Difference Latitude, between Beg. Middle, } and End			1 17
Lat. $\ominus a \ominus$ at	{ Beginning N. D.	14	9
	{ End N. D.	11	34
Time from true $\sigma$ , to the Middle add		29	16
Time of half Duration sub. and add		2 11	31
Arch of the $\odot$ 's Perimeter at	{ Beginning	64	36 0
	{ End	47	37 0
Apparent Semidiameter $\ominus$ 36", and of $\odot$		15	40

		D. h. ' "	
Hence, the apparent Time at London of the	Central Ingress, 1769, } May A	23 13 58 59	P.M.
	True Conjunction	15 41 14	
	Middle of the Eclipse	16 10 30	
	Central Egress, or End B	18 22 1	
	Total Duration	4 23 2	



The Types



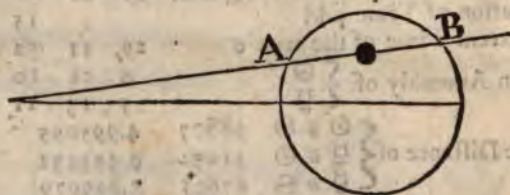
Anno 1769, on Thursday, October 29th, at Midnight, the Planet Mercury will be seen within the Sun, but invisible at London; though to them that sail a little to the Westward of California, the most Westernly Parts of America, will have it near their Meridian, and consequently visible to them; at London, a Synopsis of the Calculation stands thus.

	D.	h.	'	"
Equal Time of the true $\odot$ 1769, Oct.	29	11	36	57
Equation of Time add			15	58
Apparent Time of the true $\odot$	29	11	52	55
Mean Anomaly of $\odot$	4	11	10	29
	5	13	11	56
True Distance of $\odot$ a $\ominus$	98877	4.995095		
	$\oslash$ a $\odot$	31272	4.495151	
	$\oslash$ a $\ominus$	67605	4.829979	
Geocentric $\begin{cases} \text{Long. } \odot \text{ and } \oslash \\ \text{Latitude } \oslash \text{ N. A.} \end{cases}$	$\cap$	17	50	37
			7	42
Anomaly of Commutation	6	0	0	0
Inclination, or Heliocentric Latitude N. A.	16	38		
Elongation to 6 Hours before the $\odot$	35	23		
Difference Latitude to 6 Hours	5	5		
Angle of the visible Way over $\odot$	8°	10	32	
Nearest Approach of their Centers		7	37	
Motion from the Middle, to the true $\odot$		1	5	
Latitude of $\oslash$ at the Middle		7	32	
Motion of half the visible Way		14	11	
Motion of half Duration		14	2	
Difference				

Difference Latitude, between Middle, Beginning, and End		1	0
Lat. $\varphi$ $a$ $\ominus$ at $\left\{ \begin{array}{l} \text{Beginning} \\ \text{End} \end{array} \right.$		2	1
Time from the Middle, to the true $\sigma$ sub.		5	31
Time of half Duration sub. and add		9	33
Arch of $\odot$ 's Perimeter at $\left\{ \begin{array}{l} \text{Beginning} \\ \text{End} \end{array} \right.$		20	5
Apparent Semidiameter $\varphi$ $4''$ , and of $\odot$		36	26
		16	6

		D.	h.	'	"
Hence, the apparent Time at London of the	Central Ingress, 1769, $\left\{ \begin{array}{l} \text{October A} \\ \text{Middle of the Eclipse} \end{array} \right.$	29	9	19	3
	True Conjunction	11	41	53	
	Central Egress, or End B	11	52	55	
	Total Duration	14	4	43	
		4	45	40	

The Type.



Anno 1776, on Saturday, the 22<sup>d</sup> Day of October, Mercury passes over the Sun, it will be visible in America; (if Clouds interpose not) a Synopsis of the Calculation under the Meridian of the famous City of London, presents itself to your View, thus.

	D.	h.	'	"
Equal Time of the true $\sigma$ 1776, Oct.	22	11	4	36
Equation of Time add			16	23
Apparent Time at London	22	11	20	59
			Mean	

*A Treatise of Eclipses.*

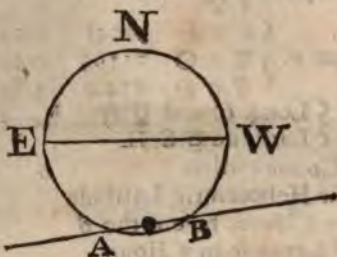
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		<i>D.</i>	<i>h.</i>	<i>'</i>	<i>"</i>
Mean Anomaly of $\left\{ \begin{array}{l} \odot \\ \oslash \end{array} \right.$		4	4	27	34
		5	8	33	31
True Distance of $\left\{ \begin{array}{l} \odot a \ominus \\ \oslash a \odot \\ \oslash a \ominus \end{array} \right.$	99041 31594 67447	4.995814 4.499600 4.828963			
Geocentric $\left\{ \begin{array}{l} \text{Long. } \odot \text{ and } \oslash \text{ R.} \\ \text{Latitude } \oslash \text{ S. D.} \end{array} \right.$	$\text{III}^{\circ} 11'$	4	49		
		15	30		
Anomaly of Commutation	6	0	0	0	
Inclination, or Heliocentric Latitude		33	6		
Elongation to 6 Hours before the $\sigma$		35	2		
Difference of Latitude in 6 Hours		5	8		
Angle of the visible Way		8	20	10	
The nearest Approach of their Centers		15	20		
Motion from the true $\sigma$ to the Middle		2	13		
True Latitude of $\oslash$ at the Middle S. D.		15	10		
Motion of half the visible Way		4	47		
Motion of half Duration		4	44		
Difference of Latitude, between Middle, Beginning and End			41		
Lat. $\oslash a \ominus$ at $\left\{ \begin{array}{l} \text{Beginning S. D.} \\ \text{End S. D.} \end{array} \right.$		15	52		
		14	28		
Time from the $\sigma$ to the Middle add		22	52		
Time of half Duration sub. and add		48	46		
Arch of the $\odot$ 's Perimeter at $\left\{ \begin{array}{l} \text{Beginning} \\ \text{End} \end{array} \right.$	80° 64	57	0		
		16	4		
Apparent Semidiameter $\oslash$ 4" and of $\odot$					

		<i>D.</i>	<i>h.</i>	<i>'</i>	<i>"</i>
Hence, the apparent Time at London of the $\left\{ \begin{array}{l} \text{Central Ingress, 1776, } \\ \text{October A} \end{array} \right.$		22	10	55	15
$\left\{ \begin{array}{l} \text{True Conjunction} \\ \text{Middle of the Eclipse} \end{array} \right.$		11	21	9	P.M.
$\left\{ \begin{array}{l} \text{Central Egress, or End, B} \\ \text{Total Duration} \end{array} \right.$		11	41	1	
		12	32	47	
		137	32		



The Type.



Anno 1782, on Tuesday, November 1st, in the Afternoon, Mercury passes over the Sun, and thereby causes a black Spot, but it cannot be seen at London by reason the Sun is set e'er ☿ seems to touch his Disk, but in the West-Indies it may be seen. It happeneth at London as followeth:

	D.	h.	′	″
Equal Time of true ☿, is 1782, Nov.	1	5	27	45
Equation of Time add			15	39
Apparent Time of the true ☿ at London	1	5	43	24
Mean Anomaly of ☿		4	13	33
		5	14	49
True Distance of ☿ a ⊙	98823	4.994857		
☿ a ⊙	31174	4.493794		
☿ a ⊖	67649	4.830262		
Geocentric ☿ Long. ⊙ and ☿ R.	11	20	27	17
☿ Latitude ☿ N. A.			15	52
Anomaly of Commutation	6	0	0	0
Inclination, or Heliocentric Latitude N. A.			34	18
Elongation to ☿ Hours before ☿			35	28
Difference of Latitude to ☿ Hours			5	8
Angle of the visible Way	8	14		8
Nearest Approach of their Centers			15	42
Motion from the Middle, to the true ☿			2	50
Latitude of ☿ at the Middle N. A.			15	52
Motion of half the visible Way			3	33
Motion of half Duration			3	31
				Difference

Difference Latitude, between Middle, Begin.			
and End	}		30
Lat. $\varphi$ $\alpha$ $\ominus$ at	{	Beginning N. A.	15 2
	{	End N. A.	16 3
Time from the Middle, to true $\sigma$ sub.			22 50
Time of half Duration sub. and add			35 41
Arch of the $\odot$ 's Perimeter at	{	Beginning	69 1 0
	{	End	85 25 0
Apparent Semidiameter $\varphi$ 4", and of $\odot$			16 6

		<i>D. h. ' "</i>	
Hence, the apparent Time at London of the	{	Central Ingress, 1782, } 1 4 44 53	} P.M.
		November A	
	{	Middle of the Eclipse	
		5 20 34	
	{	True Conjunction	
		5 43 24	
	{	Central Egress, or End B	5 56 15
		Total Duration	1 11 22

The Type.



Anno 1786, on *Wednesday*, April the 22d, Astronomical Time, or on *Thursday* Morning, if the Air be clear; at *London*, Mercury will be seen as a black Spot in the Sun, by such as are fitted with proper Instruments, and capable to observe him; a Synopsis of the Calculation stands thus.

	<i>D. h. ' "</i>	
Equal Time true $\sigma$ at <i>London</i> ,	{	22 20 15 2
1786, April		
Equation of Time add		3 23



	D.	h.	'	
Apparent Time of the true $\sigma$	22	20	18	25
Mean Anomaly of $\left\{ \begin{array}{l} \odot \\ \oslash \end{array} \right.$	10	3	55	5
	10	16	25	47
True Distance of $\left\{ \begin{array}{l} \odot a \ominus \\ \oslash a \odot \\ \oslash a \ominus \end{array} \right.$	100987	5.004264		
	45119	4.654358		
	55868	4.747163		
Geocentric $\left\{ \begin{array}{l} \text{Long. } \odot \text{ and } \oslash \text{ R.} \\ \text{Latitude } \oslash \text{ N. D.} \end{array} \right.$	8	13	56	58
			10	40
Anomaly of Commutation	6	0	0	0
Inclination, or Heliocentric Latitude N. D.	13	13		
Elongation to 6 Hours before $\sigma$		23	32	
Difference of Latitude to 6 Hours		4	14	
Angle of the visible Way over $\odot$	10°	11	50	
Nearest Approach of their Centers		10	30	
Motion from the true $\sigma$ , to the Middle		1	50	
True Latitude of $\oslash$ at the Middle N. D.		10	20	
Motion of half the visible Way		11	45	
Motion of half Duration		11	34	
Difference of Latitude, between Middle, Beginning and End		2	5	
True Lat. of $\oslash a \ominus$ at $\left\{ \begin{array}{l} \text{Beginning} \\ \text{End} \end{array} \right.$		12	25	
		8	15	
Time from true $\sigma$ to the Middle add		28	26	
Time of half Duration sub. and add	2	57	7	
Arch of the $\odot$ 's Perimeter at $\left\{ \begin{array}{l} \text{Beginning} \\ \text{End} \end{array} \right.$	51	55	0	
	31	32	0	
Apparent Semidiameter $\oslash 6''$ , and of $\odot$	15	45		

			D.	h.	'	"		
Hence, the apparent Time at London of the	{	Central Ingress, 1786,	}	22	17	49	44	} P.M.
		April $\Lambda$						
		True Conjunction		20	18	25		
		Middle of the Eclipse		20	46	51		
		Central Egress, or End B		23	43	58		
	{	Total Duration	}	5	54	14		

The Type.



Anno 1789, on *Thursday*, the 25th Day of *October*, in the Afternoon, if the Air is clear, at *London*, *Mercury* will be seen in the Sun, by such as are fitted with a good Telescope for that Purpose; the Sun will set with *Mercury* upon his Disk: a Synopsis of the Calculation follows.

	D.	h.	'	"
Equal Time of the true $\odot$ 1789, Oct. 25	5	6	0	
Equation of Time add		16	18	
Apparent Time true $\odot$ at <i>London</i>	25	5	22	18
Mean Anomaly of $\odot$	4	6	50	54
	5	10	13	6
True Distance of $\odot$ a $\ominus$ 98481	4.995552			
	$\oslash$ a $\odot$ 31471	4.497913		
	$\oslash$ a $\ominus$ 67510	4.829368		
Geocentric $\angle$ Long. $\odot$ and $\oslash$ R $\gamma$	m	13	41	25
$\angle$ Latitude $\oslash$ S. D.		7	12	
Anomaly of Commutation	6	0	0	0
Inclination, or Heliocentric Latitude S. D.	15	27		
Elongation to $\odot$ Hours before the $\odot$	35	8		
Difference of Latitude to $\odot$ Hours	5	8		
Angle of the visible Way over $\odot$	8°	18	46	
Nearest Approach of their Centers	7	7		
Motion from the true $\odot$ to the Middle	1	2		
True Latitude of $\oslash$ at the Middle S. D.	7	3		
Motion of half the visible Way	14	25		
Motion of half Duration	14	16		
Difference				

Difference Latitude between Middle, Beg. } and End	2	5
Lat. $\varphi$ seen $\ominus$ at { Beginning S. D.	9	8
{ End S. D.	4	58
Time from the $\sigma$ to the Middle add	10	19
Time of half Duration sub. and add	2	26
Arch of the $\odot$ 's Perimeter at { Beginning	34	36
{ End	17	58
Apparent Semidiameter $\varphi$ 4", and of $\odot$	16	5

	D. h. ' "	
Hence, the appa- rent Time at Lon- don of the { Central Ingress, 1789, } October A { 25 3 6 25 } True Conjunction { 5 22 18 } P.M. Middle of the Eclipse { 5 32 37 } Central Egress, or End, B { 7 58 49 } Total Duration { 4 52 24 }		

The Type.



It may here be thought something strange to those unskilled in Astronomy, that in the Transit of  $\varphi$  over the Sun, in the Year 1786, his Latitude was  $10' 40''$ , and here but  $7' 12''$ ; by which, in this the Chord of the Sun made by the Line of  $\varphi$ 's visible Way is greater, than in the other Transit, and yet the Duration of the Passage over the Sun, is less here than in that by one Hour,  $1' 50''$ . The Reason is, in this, he is near his Perihelion, and in the other, near his Aphelion, as may be seen by his mean Anomaly in each Transit; consequently, in the other he moves Slow, but in this Fast.

Anno



Anno 1799, on Tuesday, April the 26th, in the Afternoon, at London, if Clouds interpose not; I desire the industrious Astronomer to prepare his Telescope, and observe the long Transit of  $\odot$  over the Sun, when he will continue more than seven Hours upon the Sun's Disk, as you may the better perceive by what follows.

*A Synopsis of the Calculation of this Transit.*

	<i>D.</i>	<i>h.</i>	<i>'</i>	<i>"</i>
Equal Time of the true $\odot$ 1729, April 26	4	48	18	
Equation of Time add			3	40
Apparent Time at London	26	4	51	58
Mean Anomaly of $\odot$	10	6	54	15
	10	20	34	1
True Distance of $\odot$ a $\ominus$	101059	5.00	4547	
	45398	4.65	7036	
	55661	4.74	5551	
Geocentric $\odot$ Long. $\odot$ and $\odot$ R $\odot$	8	17	2	53
			6	32
Anomaly of Commutation	6	0	0	0
Inclination, or Heliocentric Latitude S. A.			8	0
Elongation to 6 Hours before the $\odot$			23	32
Difference of Latitude to 6 Hours			4	16
Angle of the visible Way over $\odot$	10°	20		53
Nearest Approach of their Centers			6	25
Motion from the Middle, to the true $\odot$			1	9
True Latitude of $\odot$ at the Middle S. A.			6	19
Motion of half the visible Way			14	22
Motion of half Duration			14	8
Difference Latitude, between Middle, Beginning and End			2	34
$\odot$ true Lat. seen a $\ominus$ at Beginning S. A.			3	45
			8	53
Time from the true $\odot$ to the Middle sub.			17	43
Time of half Duration sub. and add	3	38		0
Arch of the $\odot$ 's Perimeter at Beginning	13	48		0
			34	22
Apparent Semidiameter $\odot$ 6", and of $\odot$			15	45
				Hence,



		D. h. ' "	
Hence, the apparent Time at London of the	{ Central Ingress, 1799, }	26	0 56 15
	April A		
	{ Middle	4	34 15
	{ True Conjunction	4	51 58
	{ Central Egress, or End B	8	12 15
	{ Total Duration	7	16 0

P.M.

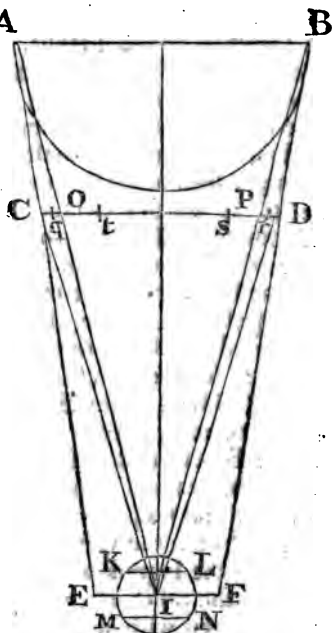
The Type.



*April 26, 1799, Sun's Declination is  $16^{\circ} 58'$  North, and his Ascen. Difference is  $22^{\circ} 35'$ , which in time is  $1^h 36' 20'' + 6^h = 7^h 36' 20''$ , the true time of Sun's setting that Night at London; by which I prove the Sun sets  $41' 55''$  before *Mercury* is got off his Disk, or the central end of the Transit. And here I have given you thirteen Transits of *Mercury* over the Sun, and two of *Venus* in this present Century; which I hope will be very acceptable to all the Legitimate Sons of *Urania*, Gentlemen and others, who I hope will observe the same as often as Opportunity will permit.*

To conclude these Transits of *Venus* and *Mercury* over the Sun, I shall add some Use that Astronomers make of them in finding the Sun's Horizontal Parallax; and, because I would be as Concise as possible, but withal plain, I shall follow the Steps of Dr. *Halley* and Mr. *Whiston*, and exemplify it in the Transit of *Mercury*, which will happen *October 31st, 1736*; which Calculation I have given you in my System, Page 25, &c.

In this Scheme, let  
 A B be the Sun's Di-  
 ameter, =  $31' 40''$ , C D  
 the visible Way of *Mer-*  
*cury* over the Sun,  
 whose Duration is  $3h$   
 $1' 52''$ ; E F the Earth's  
 Diameter, = 7969.16  
 English Miles. Let  
 K L N M be the Pa-  
 rallel of *London*, in  
 which Latitude we are  
 to find how many Miles  
 make one Degree of  
 Longitude thus :



As Radius	90	0'	10.000000
To the Miles in one Degree under $\frac{1}{2}$	69.5		2.841985
the Equator			
So CS. Latitude	51	32	9.793832
To Miles in one Degree in that Pa- $\frac{1}{2}$	43.23		2.635817
rallel			

By this, I find that 43.23 Miles (true Measure)  
 is one Degree of Longitude in the Parallel of *Lon-*  
*don*, whose Radius is 2476.89 Miles thus found.

Miles in one Degree 43.23  
 $\frac{360}{43.23}$   
 8353.80  
 12969

If  $3.14159 : 1 :: 15562.8000000$  (4953.79 Diameter.  
 ..... 2476.895 Radius.

Y

Let

Let  $KL$  and  $MN$  be Chords, each of  $3b\ 1' 52''$ , the Duration of the Transit, which reduced into Degrees of the Equator, are  $45^\circ 28' = 1965''.52$  Miles. Now, from this Diagram, 'tis plain, that if there were two Spectators at  $E$  and  $F$ , without any diurnal Motion, they would have the same Angle for the Sun's Diameter seen to each of them: and to a Spectator, to one at the Earth's Center  $AIB = 31' 40'' = 1900''$ , and the same Duration of the Transit from  $O$  to  $P = 5b\ 1' 52'' = 10912''$  of Time; but since the Spectator at  $M$  to the West of *London*, after he has seen the Ingress at  $q$ , during the Time of the Transit, will be carried to  $N$ , by the Rotation of the Earth, and there will see the Egrefs at  $r$ ; and he, at  $L$ , under the same Meridian, in the East, that saw the Egrefs at  $r$ , will be thereby arrived in contrary Direction to  $K$ , to see the Egrefs at  $s$ . Here will be a double Parallax, answerable to the Time and Angle of the Transit, along  $qt$  and  $rs$ ; the one in Excess, the other in Defect, and both the very same, as if a single Spectator had seen the Ingress when he was at  $E$ , at the Point  $C$ ; and the other when he was at  $F$ , at the Point  $D$ ; as compared with a Spectator that continued in the Earth's Center at  $I$ , all that time. In this Example then, the half Sum of their two Durations, and Angles to be as before  $10912''$ , and the Sun's Diameter  $1900''$  for angular Measure; and let us suppose their Difference  $2CO = 4' = 240''$  of Time. Now say, as the Time of the Transit in Seconds, is to the Sum of the supposed Differences of the Spectators observed: so is the Sun's Apparent Diameter, to double the Difference of the two Observers.

### OPERATION.

As  $10912'' : 240'' :: 1900'' : 41'' = 2CIO$ , whose half is  $20'' = CIO = PID$ ; which, with the Angle  $CAO$ , bearing the same Proportion to this, that  $CA$ , the Distance of *Mercury* from the Sun  $31197$ , bears to  $CI$ , the Distance of *Mercury* from the Earth  $67677$   
 $= \angle ECI$ . As

☿ a ⊙ ☿ ab ⊙

As  $31197:20''::67677:43''$ , which is the Angle of the Parallax of *Mercury*; for so much doth the Diameter of the Earth appear to an Eye placed in *Mercury*, or, as being subtended by 1965.52 Miles. But this must now be increased as the Earth's Semidiameter 3984.58 is to 1965.52, and then we shall have *Mercury's* true Parallax at that time, thus.

⊙ Miles Miles

As  $3984.58:1965.52::43'':21''$ , ☿'s true Parallax. Now the Sun's Horizontal Parallax is in a reciprocal Proportion to the Distance of Sun and *Mercury* from the Earth, thus.

☿ ab ⊙ ⊙ ab ⊙

As  $67677:21''::98874:15''$  *ferè*. Here comes out  $15''$  for the Sun's Horizontal Parallax, which is  $3''$  more than I have it in my System; the Reason is, that in this Work, above the Angle  $CIO = PID$ , is supposed to be  $2'$ , and was not actually observed. But I doubt not, if the Times of the Transit be carefully observed, and that Angle truly ascertained, (which I suppose will be found smaller than what is here estimated) that then the Sun's Horizontal Parallax will be found nearer  $10''$  than  $15$ , as is now retained by all our Modern Astronomers.

The Transits of *Venus* over the Sun are much fitter for this purpose, than those of *Mercury*, by reason *Venus* is nearer to our Earth, and consequently her Parallax is more than that of *Mercury*; the Angles  $ECl = FDI$  will be increased in a reciprocal Ratio of the Distance from the Earth.

I have told you in the Beginning of these Transits, that I have deduced them from *Astronomia Carolina*; this is therefore to inform my Reader, that those Numbers are now very defective in the Places of all the Planets, as any one may find, if they will take the pains to compare them with my System, and with the Observations of the present Age. As for Instance, the Transit of ☿, *October* 29th, 1723, was observed at *London* to touch the Sun's Perimeter at  $20'$  before



3 in the Afternoon. Also the Equal Time of the true Conjunction of the Sun and *Venus* 1761, is *May* 25d 17h 54' 8" by my System, and the apparent Time at 55' 59" past 3 in the Morning, on the 26th Day; *Dr. Halley* has it 25d 17h 35', in  $\Pi$  15° 37'; *Street's* Numbers give it *May* 26th Day, at 59' 7" past 10 *Mane*, in  $\Pi$  15° 47'; which great Difference in Time and Place, is not to be reconciled by any that are Lovers of Astronomy.

*A Reply to Tychio Wing, in Coley's Almanack, for the Years 1730, and 1731, by way of Reprimand.*

**T**HIS young Calculator no sooner appears upon the publick Stage, but he falls foul upon two of our annual Writers, and says that they differ in the Place of ♀ 20' from each other, in the Year 1728, in the Month of *April*; which Assertion of his is False, as may be seen by the under-written. The Place of ♀ *April* 3d, 1728, according

to {	<i>Parker</i>	✕	20°	45'	} Diff. 15'
	<i>Weaver</i>	✕	20	26	
	my Tables	✕	20	29 58,	

45" S. A. He tells the World that he has taken the Planets places from my Tables, which he finds agree with *Flamsteed's* Observations; but my Lunar Motions, he says, are so exceeding wide from Truth, as are also *Buliakus* and *Streer*, that we make the ♀ approach the Earth in the Quadratures, whereas she really removes from it; which, he says, obliged him to go through the Trouble and Pains of actually composing Tables upon *Sir Isaac Newton's* Theory. Now, as to the first of these, I challenge him to prove by a Geometrical Demonstration, that the ♀ always in the Quadratures approacheth to the Earth; Secondly, I beg that he will (the next Opportunity in *Coley's Almanack*) oblige the World with the Calculation at large of the ♀'s Place to any Day at Noon; and, Thirdly,

Thirdly, I will here prove who came nearest to the Time of the  $\text{J}$ 's Eclipse, *Jan.* 23<sup>d</sup>, 1730, when I observed it in *London*, in Company with several reputable Gentlemen, and choice of good Instruments, to begin at 5<sup>o</sup> past 2 in the Morning, and Dig. 3<sup>o</sup> 1<sup>2</sup>. By *Scientia Stellarum*, at 2h 38' Dig. 2<sup>o</sup> 53'. By *Weaver's Almanack*, at 2h 41' Dig. 3<sup>o</sup> 17'. By *Ladies Diary*, from *A. Carol: London*, at 3h 15' Dig. 2<sup>o</sup> 39'. By *Tycho Wing*, (which he says is from his New Theory) at 2h 31' Dig. 3<sup>o</sup> 6'. By my System, at 2h 56' Dig. 3<sup>o</sup> 35'. Here *Tycho's* famous Theory fails him 18' 37"; now, if this be to be depended on or not, I leave the Reader to judge. Lastly, in the said Almanack, for 1731, *Tycho* makes mention of Mr. *Wright's* Correction of Sir *Isaac's* Theory of the Moon, where he vindicates the Errors laid down by the said Mr. *Wright*, in the Moon's Mean Motion, for the Years 1681, and 1701, as also the Excentricities; and to prove the Certainty of this Correction, he there produces six of Mr. *Flamsteed's* Observations, as a Touch-stone to try those Errors by; but to let the World see how much he is mistaken, I shall here in the room of his, insert the Genuine Observations as they are in Mr. *Flamsteed's Historia Cœlestis*, taken at *Greenwich*, Lat. 51<sup>o</sup> 28' 30" North.

Apparent Time					Dist. & Vert. Cor.		
					o	'	"
1691	Sept.	20	7 21 26	16	30	55	} of the $\text{J}$ 's super Limb.
1691	Dec.	18	6 27 0	41	14	40	
1691	Dec.	19	7 10 36	5	56	10	
1692	Mar.	18	8 54 4	36	58	5	
1698	June	16	14 46 3	53	39	10	
1714	Sept.	10	10 17 25	58	16	50	

He that is able and willing to try these Observations, will find the Moon's Longitude to differ much from what *Tycho Wing* has inserted in *Coley's Almanack*.

nack for the Year 1731. And so I bid *Tycho* farewell till the next Opportunity.

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*Of the Conjunctions of Saturn and Jupiter.*

I Having finished my 35 Years Calculation of the Eclipses of the Luminaries, with the Transits of *Venus* and *Mercury* for this Century; I shall in the next Place give my Reader an account of the several Conjunctions of the two superior Planets, *Saturn* and *Jupiter*, through the fiery Trigon; which will be 140 Years e'er they finish that Triplicity. And the first time of their meeting in *Aries* (since the Year 968) was on *Monday*, the 11th Day of *May*, at 15 h. 2 min. P. M. 1702. They were then Evening Stars, and the Longitude of them was *Aries* 6 deg. 42 min. Latitude of *Saturn*, 2 deg. 14 min. South Ascending, Latitude of *Jupiter* was 1 deg. 13 min. South Ascending; *Jupiter* was elevated above *Saturn* 1 deg. 1 min. *Venus*, *Mercury* and *Moon*, are very near them.

The next time of their Meeting, will be on *Tuesday*, the 27th Day of *December*, Anno. 1722; a particular Account of which you will meet with in Page 28, of the Book; to which I refer the inquisitive Reader, for further Satisfaction.

The third time of their Meeting in this Century, is on *Monday*, the 23d Day of *August*, 20 min. past 10 at Night, Anno 1742, in 27 deg. 55 min. of *Leo*, *Saturn* has then 1 d. 17 m. Lat. North Ascending, and *Jupiter's* Latitude is 52 min. North Ascending. Here *Saturn* will be elevated above *Jupiter*, (at the time of this Conjunction) 25 min. They are then Morning Stars, and under the *Sun's* Beams.

The fourth Conjunction of *Saturn* and *Jupiter*, will be on *Friday*, the 8th Day of *March*, at 50 min. past 5 a Clock in the Morning, they meet in 12 deg. 19 min. of *Aries*, *Saturn* has then 2 deg. 15 min. South Latitude Ascending, and *Jupiter's* Latitude is 1 deg. 1 min. South Descending; and here *Jupiter* is elevated



vated 1 deg. 7 min. above *Saturn*. They are now Evening-Stars, 13 deg. 40 min. distant from the *Sun*, so cannot be seen. *Anno Dom.* 1762.

The fifth Conjunction of *Saturn* and *Jupiter*, will be in the Year 1782, on *Thursday*, the 27th Day of *October*, 15 min. past 5 a-clock in the Morning; they meet in 28 deg. 22 min. *Sagittarius*; *Saturn* has then 48 min. North Latitude Descending, and *Jupiter* has 2 min. North Latitude Descending. Here *Saturn* will be elevated 46 min. above *Jupiter*; they are now Evening-Stars, 43 deg. 27 min. distant from the *Sun*; so that in the Evening, after *Sun*-set, they may be seen South-West, pleasant to behold.

The sixth Conjunction of *Saturn* and *Jupiter*, is in the Year 1802, in the Earthly Triplicity; it happeneth on *Wednesday*, *July* 9, at 18 min. past 11 a-clock at Night, in 5 deg. 48 min. of *Virgo*, the Latitude of *Saturn* is 1 deg. 42 min. North Ascending; and of *Jupiter* 1 deg. 5 min. North Ascending. At the time of this Conjunction, *Saturn* will be elevated, 37 min. above *Jupiter*; they are now Evening-Stars, distant from the *Sun* 37 deg. 29 min. and consequently may be seen Westward after *Sun*-set.

The seventh Conjunction of *Saturn* and *Jupiter*, will be in the Year 1821, and in the fiery Trigon again; this happeneth on *Monday*, *June* 6. at 8 in the Morning, in 24 deg. 9 min. of *Aries*; *Saturn*'s Latitude is then 2 deg. 24 min. South Ascending, and *Jupiter*'s Latitude is 1 deg. 15 min. South Descending; they are both direct and swift in Motion. Here *Jupiter* is elevated above *Saturn* 1 deg. 9 min. they are now Morning-Stars, distant from the *Sun* 62 deg. 14 min. Rising before him, pleasant to behold.

Now I having given you a particular Account of the Conjunctions of the two Superiors for 140 Years to come, which will be very acceptable to all the Sons of *Urania*; where you are to observe by the way, that  $\gamma$ ,  $\Omega$ ,  $\delta$ , make the fiery Trigon;  $\delta$ ,  $\mathbb{M}$ ,  $\mathbb{N}$ , make the Earthly Triplicity;  $\Pi$ ,  $\sphericalangle$ ,  $\sphericalangle$ , make the Airy Triplicity;  $\mathfrak{S}$ ,  $\mathbb{L}$ ,  $\mathfrak{X}$ , make the Watery Trigon or Triplicity.



